

Supplementary Environmental Statement and Additional Provision 2 Environmental Statement

Volume 5 | Technical appendices map book Sound, noise and vibration

July 2015

SES and AP2 ES 3.5.18

Supplementary Environmental Statement and Additional Provision 2 Environmental Statement

Volume 5 | Technical appendices map book Sound, noise and vibration

July 2015

SES and AP2 ES 3.5.18



High Speed Two (HS2) Limited has been tasked by the Department for Transport (DfT) with managing the delivery of a new national high speed rail network. It is a non-departmental public body wholly owned by the DfT.

A report prepared for High Speed Two (HS2) Limited:

**AECOM** 

**ARUP** 

**ATKINS** 

**CAPITA** 



ineco



PARSONS BRINCKERHOFF



High Speed Two (HS2) Limited, One Canada Square, London E14 5AB

Details of how to obtain further copies are available from HS2 Ltd.

Telephone: 020 7944 4908

General email enquiries: HS2enquiries@hs2.org.uk

Website: www.gov.uk/hs2

Copyright © High Speed Two (HS2) Limited, 2015, except where otherwise stated.

High Speed Two (HS2) Limited has actively considered the needs of blind and partially sighted people in accessing this document. The text will be made available in full via the HS2 website. The text may be freely downloaded and translated by individuals or organisations for conversion into other accessible formats. If you have other needs in this regard please contact High Speed Two (HS2) Limited.



Printed in Great Britain on paper containing at least 75% recycled fibre.

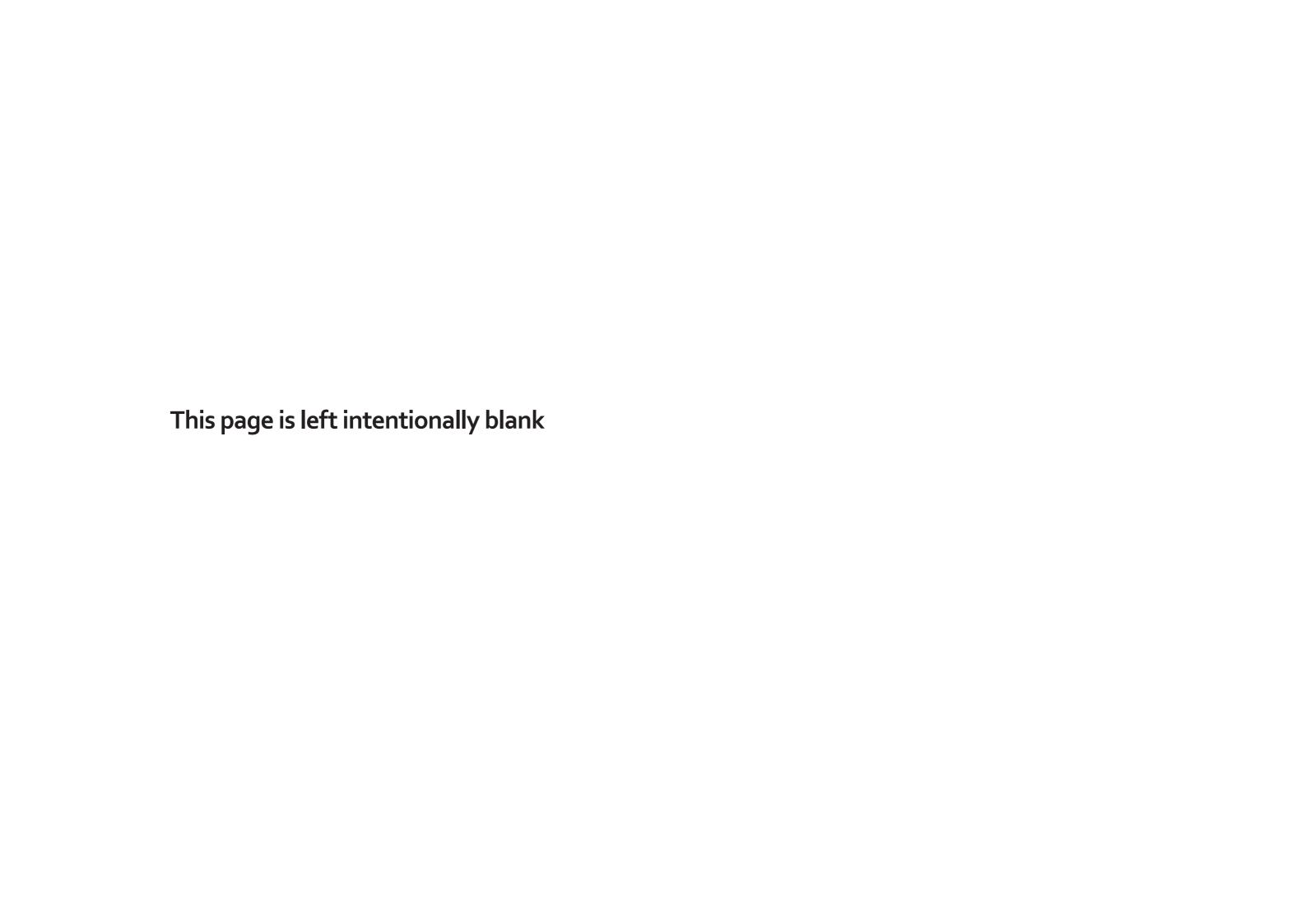
### Contents

Mapping explanatory notes

Data dictionary and definitions

| Map series name   | SV-01 Operational Sound Contour Maps<br>and Likely Significant Effects  | SV-02 Operational Airborne Noise and<br>Vibration Impacts and Likely Significant<br>Effects (with Assessment Locations)   | SV-03 Assessment and Monitoring<br>Locations for Construction Sound, Noise<br>& Vibration Assessments   | SV-04 Assessment and Monitoring<br>Locations for Operational Sound, Noise &<br>Vibration Assessments  |
|---|---|---|---|---|
| Map series description                                  | SV-01 presents the predicted operational sound from the new railway.  The sound levels from the new railway (expressed as LpAeq,T) are presented in typical noise mapping colours in 5 dB steps. There is a panel at the top right of the figure; the left-hand section of this panel contains a key communicating the night-time and daytime sound levels represented by the various colours. The right-hand part of the same panel contains text explaining how the sound levels presented on the figure inform the assessment of direct noise impacts and likely significant effects. A corresponding and similar panel is found on SV-02, along with the key sound contours that were used within the environmental assessment. | SV-02 presents the direct operational noise impacts and likely significant effects of the Proposed Scheme.  The SV-02 figure series necessarily contains a large amount of information relating to the operational noise and vibration assessment. It is designed to communicate visually the assessment process from the prediction of impacts to the determination of likely residual significant effects. The corresponding text is included in Volume 2 and Volume 5. | The SV-03 figure series accompanies the construction noise & vibration assessments. It shows the locations at which a quantitative assessment of the direct effects of construction noise and/or vibration has been carried out. These are labelled as assessment locations with a reference number to enable cross-reference to the construction noise and vibration reports contained in Volume 5: Appendix SV-003 and Volume 5: Appendix SV-002.  The figure series also shows locations at which baseline sound measurements were carried out. These baseline measurement locations are labelled with a reference number to enable cross-reference to the baseline sound reports contained in Volume 5: | The SV-04 figure series shows the locations at which a quantitative assessment of the direct effects of operational sound and/or vibration has been carried out. These are labelled as assessment locations with a reference number to enable cross-reference to the operational sound and vibration reports contained in Volume 5: Appendix SV-004 and Volume 5: Appendix SV-002.  The figure series also shows locations at which baseline sound measurements were carried out. These baseline measurement locations are labelled with a reference number to enable cross-reference to the baseline sound reports contained in Volume 5: Appendix SV-002. |
| Community Forum Area name                               | the environmental assessment.   |   | Appendix SV-002.  |   |
| CFA 04 – Kilburn (Brent) to Old Oak<br>Common           | ✓   | ✓   | ✓   | ✓   |
| CFA o5 – Northolt Corridor                              | ×   | ×   | ×   | ×   |
| CFA o6 – South Ruislip to Ickenham                      | ✓   | ✓   | ×   | ×   |
| CFA 07 – Colne Valley                                   | ×   | *   | ×   | ×   |
| CFA o8 – The Chalfonts and Amersham                     | ×   | *   | ×   | ×   |
| CFA 09 – Central Chilterns                              | ×   | ×   | ×   | ×   |
| CFA 10 – Dunsmore, Wendover and Halton                  | ×   | ×   | ×   | ×   |
| CFA 11 – Stoke Mandeville and Aylesbury                 | ✓   | ✓   | ×   | ×   |
| CFA 12 — Waddesdon and Quainton                         | ×   | ×   | ×   | ×   |
| CFA 13 – Calvert, Steeple Claydon, Twyford and Chetwode | ×   | ×   | ×   | ×   |
| CFA 14 — Newton Purcell to Brackley                     | ✓   | ✓   | ×   | ✓   |
| CFA 15 – Greatworth to Lower Boddington                 | ✓   | ✓   | ✓   | ✓   |
| CFA 16 – Ladbroke and Southam                           | ✓   | ✓   | ✓   | ×   |
| CFA 17 — Offchurch and Cubbington                       | ×   | ×   | ×   | ×   |
| CFA 18 – Stoneleigh, Kenilworth and Burton<br>Green     | ✓   | ✓   | ✓   | ✓   |
| CFA 19 — Coleshill Junction                             | ✓   | ✓   | ×   | ×   |
| CFA 20 – Curdworth to Middleton                         | ✓   | ✓   | ✓   | ✓   |
| CFA 21 — Drayton Bassett, Hints and<br>Weeford          | ✓   | ✓   | ✓   | ×   |

| Map series name   | SV-01 Operational Sound Contour Maps<br>and Likely Significant Effects  | SV-02 Operational Airborne Noise and<br>Vibration Impacts and Likely Significant<br>Effects (with Assessment Locations)   | SV-03 Assessment and Monitoring<br>Locations for Construction Sound, Noise<br>& Vibration Assessments   | SV-04 Assessment and Monitoring<br>Locations for Operational Sound, Noise &<br>Vibration Assessments  |
|---|---|---|---|---|
| Map series description  | SV-01 presents the predicted operational sound from the new railway.  The sound levels from the new railway (expressed as LpAeq,T) are presented in typical noise mapping colours in 5 dB steps. There is a panel at the top right of the figure; the left-hand section of this panel contains a key communicating the night-time and daytime sound levels represented by the various colours. The right-hand part of the same panel contains text explaining how the sound levels presented on the figure inform the assessment of direct noise impacts and likely significant effects. A corresponding and similar panel is found on SV-02, along with the key sound contours that were used within the environmental assessment. | SV-02 presents the direct operational noise impacts and likely significant effects of the Proposed Scheme.  The SV-02 figure series necessarily contains a large amount of information relating to the operational noise and vibration assessment. It is designed to communicate visually the assessment process from the prediction of impacts to the determination of likely residual significant effects. The corresponding text is included in Volume 2 and Volume 5. | The SV-03 figure series accompanies the construction noise & vibration assessments. It shows the locations at which a quantitative assessment of the direct effects of construction noise and/or vibration has been carried out. These are labelled as assessment locations with a reference number to enable cross-reference to the construction noise and vibration reports contained in Volume 5: Appendix SV-002.  The figure series also shows locations at which baseline sound measurements were carried out. These baseline measurement locations are labelled with a reference number to enable cross-reference to the baseline sound reports contained in Volume 5: | The SV-04 figure series shows the locations at which a quantitative assessment of the direct effects of operational sound and/or vibration has been carried out. These are labelled as assessment locations with a reference number to enable cross-reference to the operational sound and vibration reports contained in Volume 5: Appendix SV-004 and Volume 5: Appendix SV-002.  The figure series also shows locations at which baseline sound measurements were carried out. These baseline measurement locations are labelled with a reference number to enable cross-reference to the baseline sound reports contained in Volume 5: Appendix SV-002. |
| Community Forum Area name                                       |   |   | Appendix SV-002.  |   |
| CFA 22 — Whittington to Handsacre                               | ✓   | ✓   | ✓   | ✓   |
| CFA 23 – Balsall Common and Hampton-in-<br>Arden                | ✓   | ✓   | ×   | ×   |
| CFA 24 — Birmingham Interchange and<br>Chelmsley Wood           | ✓   | ✓   | ×   | ×   |
| CFA 25 – Castle Bromwich and Bromford                           | *   | ×   | ×   | ×   |
| CFA 26 – Washwood Heath to Curzon Street                        | ×   | ×   | ✓   | ×   |
| Off-route – Heathrow Express (HEx) Depot<br>Relocation          | ×   | ✓   | ✓   | ✓   |
| Off-route – Modifications to WCML between Lichfield and Colwich | *   | ×   | ×   | ×   |



### Mapping explanatory notes

#### Structure of the HS2 Supplementary Environmental Statement and Additional Provision 2 Environmental Statement

The Supplementary Environmental Statement (SES) and Additional Provision 2 Environmental Statement (AP2 ES) comprises:

- Non-technical summary (NTS). This provides a summary in non-technical language of the SES (Part 1) and AP2 ES (Part 2) and of any likely significant environmental effects, both beneficial and adverse, which are new or different to those reported in the High Speed 2 (HS2) Phase One Environmental Statement (ES) submitted to Parliament in November 2013 in support of the hybrid Bill ('the Bill') for Phase One of HS2 (hereafter referred to as 'the main ES') and, where relevant, the AP ES submitted in September 2014 (hereafter referred to as 'the AP1 ES').
- Volume 1: Introduction to the SES and the AP2 ES. This introduces the supplementary environmental information and design changes included within the SES and amendments which have resulted in the need to amend the Bill within the AP2 ES. It also explains any changes to the scope, methodology, assumptions and limitations required for the environmental impact assessment.
- Volume 2: Community Forum Area (CFA) reports and Map Books. These describe the supplementary environmental information and design changes included within the SES (Part 1), amendments within the AP2 ES (Part 2) and report any new or different likely significant environmental effects arising from these changes in each CFA compared to those reported in the main ES and, where relevant, the AP1 ES. The main local alternatives that have been considered are described, where relevant.
- Volume 3: Route-wide effects. This reports new or different likely significant route-wide effects arising from the supplementary environmental information and design changes included within the SES (Part 1) and amendments within the AP2 ES (Part 2) compared to those reported in the main ES and, where relevant, the AP1 ES.
- Volume 4: Off-route effects. This reports new or different likely significant off-route effects arising from the supplementary environmental information and design changes included within the SES (Part 1) and amendments within the AP2 ES (Part 2) compared to those reported in the main ES and, where relevant, the AP1 ES.
- Volume 5: Appendices and Map Books. This contains supporting environmental information and associated maps in support of the CFA sections of Volume 2.
- Glossary of terms and list of abbreviations. This contains any new or different terms and abbreviations used throughout the SES and AP2 ES compared to those included in the main ES and AP1 ES.

#### **Copyright statements**

Copyright statements are presented in the Data dictionary and definitions section at the front of the map book, due to limited space to include this on the individual maps themselves.

#### **Ordnance Survey data**

All maps produced as part of the London-West Midlands Supplementary Environmental Statement (SES) and Additional Provision 2 Environmental Statement (AP2 ES) contain Ordnance Survey (OS) data. HS2 Ltd use the most up to date mapping available, where possible, supplied by the OS and as such, we cannot be held responsible for any inaccuracies within this data.

As part of our licence conditions, all digital maps carry a watermark.

#### Chainage

Most of the maps presented as part of the SES and AP2 ES have a chainage value shown next to the alignment. Chainage is presented on the maps in black font, in the form of XX+YYY. E.g. 77+000 or 158+500.

Chainage (known as reference chainage) is referenced from Euston Station, which is 0+000, and the value presented is in metres. E.g. 77+000 refers to the point, 77,000m, or 77km, from Euston Station. Chainage values increase in intervals dependent on the map scale. For maps at 1:50,000 scale chainage is shown at 5km intervals. For maps at 1:25,000 scale chainage is shown at 1km intervals. For maps at 1:10,000, 1:5,000 and 1:2,500 scales, chainage is shown at 1km intervals.

Chainage has been included on the maps as a useful tool for comparing different map sets showing the different environmental themes or engineering plans, due to map sets having different scales and therefore showing different amounts of alignment on the map.

#### Map sheet layout

Each map in Volume 2 is presented twice, with the main ES map (published November 2013) on the left hand page and the SES and AP2 ES map on the right. For the CT-05 and CT-06 map series, the SES and AP2 ES map is annotated with different coloured clouds which highlight the areas of change. The coloured text box provides a brief description of the design change and amendment, and gives the SES and AP2 ES are included within the map books. Other design changes which are within the existing limits of the Bill and do not result in new or different likely significant effects are also shown on the maps, but are not indicated by a cloud. The below table highlights the coloured clouds used, and their description.

| Cloud / text box colour | Description  |
|-------------------------|--|
| Blue                    | Design changes relating to the SES (Part 1 of each Volume 2 CFA report).                     |
| Red                     | Proposed amendments relating to AP2 (Part 2 of each Volume 2 CFA report).                    |
| Grey                    | Proposed amendments relating to AP1, as they appeared in the AP1 ES, provided for reference. |

Each Volume 5 map is annotated to describe the change to a receptor or significant effect, and to give the SES and AP2 ES reference number. For more detailed information about the SES and AP2 ES annotation, refer to the map series legend. Only maps which have been amended as a result of the SES and AP2 ES are included within the map book.

#### Map orientation

The majority of the maps presented in these map books are presented with the railway alignment running horizontally across the page. The direction of travel to London would be following the alignment to the right hand side of the page, and the West Midlands to the left.

The exception to this, are map series LV-03 and LV-04, which present the alignment running from bottom to top of the page. This is to allow more of the modelled outputs to be shown at the appropriate map scale. In this instance, the direction of travel to London would be to the bottom of the page, and the West Midlands to the top.

### Map books

In total there are 53 map books which make up the SES and AP2 ES, spread across volumes 2, 4 and 5. A list of the titles is provided below for reference.

| Name   | Name   |
|--|--|
| Volume 2 Community forum area map book: CFA4 Kilburn (Brent) to Old Oak Common               | Volume 5 Technical appendices map book: Ecology - London Metropolitan (CFA4-6)                         |
| Volume 2 Community forum area map book: CFA5 Northolt Corridor                               | Volume 5 Technical appendices map book: Ecology - CFA7 Colne Valley                                    |
| Volume 2 Community forum area map book: CFA6 South Ruislip to Ickenham                       | Volume 5 Technical appendices map book: Ecology - CFA8 The Chalfonts and Amersham                      |
| Volume 2 Community forum area map book: CFA7 Colne Valley                                    | Volume 5 Technical appendices map book: Ecology - CFA9 Central Chilterns                               |
| Volume 2 Community forum area map book: CFA9 Central Chilterns                               | Volume 5 Technical appendices map book: Ecology - CFA10 Dunsmore, Wendover and Halton                  |
| Volume 2 Community forum area map book: CFA10 Dunsmore, Wendover and Halton                  | Volume 5 Technical appendices map book: Ecology - CFA11 Stoke Mandeville and Aylesbury                 |
| Volume 2 Community forum area map book: CFA11 Stoke Mandeville and Aylesbury                 | Volume 5 Technical appendices map book: Ecology - CFA12 Waddesdon and Quainton                         |
| Volume 2 Community forum area map book: CFA12 Waddesdon and Quainton                         | Volume 5 Technical appendices map book: Ecology - CFA13 Calvert, Steeple Claydon, Twyford and Chetwode |
| Volume 2 Community forum area map book: CFA13 Calvert, Steeple Claydon, Twyford and Chetwode | Volume 5 Technical appendices map book: Ecology - CFA14 Newton Purcell to Brackley                     |
| Volume 2 Community forum area map book: CFA14 Newton Purcell to Brackley                     | Volume 5 Technical appendices map book: Ecology - CFA15 Greatworth to Lower Boddington                 |
| Volume 2 Community forum area map book: CFA15 Greatworth to Lower Boddington                 | Volume 5 Technical appendices map book: Ecology - CFA16 Ladbroke and Southam                           |
| Volume 2 Community forum area map book: CFA16 Ladbroke and Southam                           | Volume 5 Technical appendices map book: Ecology - CFA17 Offchurch and Cubbington                       |
| Volume 2 Community forum area map book: CFA17 Offchurch and Cubbington                       | Volume 5 Technical appendices map book: Ecology - CFA18 Stoneleigh, Kenilworth and Burton Green        |
| Volume 2 Community forum area map book: CFA18 Stoneleigh, Kenilworth and Burton Green        | Volume 5 Technical appendices map book: Ecology - CFA19 Coleshill Junction                             |
| Volume 2 Community forum area map book: CFA19 Coleshill Junction                             | Volume 5 Technical appendices map book: Ecology - CFA20 Curdworth to Middleton                         |
| Volume 2 Community forum area map book: CFA20 Curdworth to Middleton                         | Volume 5 Technical appendices map book: Ecology - CFA21 Drayton Bassett, Hints and Weeford             |
| Volume 2 Community forum area map book: CFA21 Drayton Bassett, Hints and Weeford             | Volume 5 Technical appendices map book: Ecology - CFA22 Whittington to Handsacre                       |
| Volume 2 Community forum area map book: CFA22 Whittington to Handsacre                       | Volume 5 Technical appendices map book: Ecology - West Midlands Metropolitan (CFA23-26)                |
| Volume 2 Community forum area map book: CFA23 Balsall Common and Hampton-in-Arden            | Volume 5 Technical appendices map book: Ecology - Off-route  |
| Volume 2 Community forum area map book: CFA24 Birmingham Interchange and Chelmsley Wood      | Volume 5 Technical appendices map book: Land quality   |
| Volume 2 Community forum area map book: CFA25 Castle Bromwich and Bromford                   | Volume 5 Technical appendices map book: Landscape and visual   |
| Volume 2 Community forum area map book: CFA26 Washwood Heath to Curzon Street                | Volume 5 Technical appendices map book: Socio-economics  |
| Volume 4 Off-route effects map book  | Volume 5 Technical appendices map book: Sound, noise and vibration                                     |
| Volume 5 Technical appendices map book: Agriculture, forestry and soils                      | Volume 5 Technical appendices map book: Traffic and transport  |
| Volume 5 Technical appendices map book: Air quality  | Volume 5 Technical appendices map book: Water resources  |
| Volume 5 Technical appendices map book: Community  | Volume 5 Technical appendices map book: Cross-topic appendix 1 - Committed developments                |
| Volume 5 Technical appendices map book: Cultural heritage                                    |  |

Supplementary Environmental Statement and Additional Provision 2 Environmental Statement

Volume 5 | Data dictionary and definitions

### Data dictionary and definitions

| Legend features  | Definition   | Source                   | Copyright  |
|--|--|--------------------------|--|
| Airborne sound and vibration assessment location                     | Locations near surface sections of the route at which a quantitative assessment of airborne sound and ground-borne vibration impacts due to the operation of the Proposed Scheme has been carried out. These are labelled with an assessment location reference code to enable cross-reference to the operational sound and vibration reports contained in Volume 5: Appendix SV-004.  | High Speed Two (HS2) Ltd |  |
| Airborne sound assessment location                                   | Locations at which a quantitative assessment of airborne sound impacts due to the operation of the Proposed Scheme has been carried out. These are labelled with an assessment location reference code to enable cross-reference to the operational sound and vibration reports contained in Volume 5: Appendix SV-004.  | High Speed Two (HS2) Ltd |  |
| Airborne sound, ground-borne sound and vibration assessment location | Locations at which a quantitative assessment of airborne sound, ground-borne sound and vibration impacts due to the operation of the Proposed Scheme has been carried out. These are labelled with an assessment location reference code to enable cross-reference to the operational sound & vibration reports contained in Volume 5: Appendix SV-004.  | High Speed Two (HS2) Ltd |  |
| Airborne sound study area  | This defines the area within which operational airborne sound impacts of the scheme have been quantitatively assessed. This area is defined as within 1km of surface sections of the route in rural areas and within 500m of surface sections of the route in urban areas.   | High Speed Two (HS2) Ltd |  |
| Baseline measurement locations                                       | These represent locations at which sound measurements were carried out as part of the baseline sound surveys. Measurements of existing baseline sound levels at these locations have been used to derive baseline sound levels at operational and construction sound assessment locations. These baseline measurement locations are labelled with a reference number which enables cross-reference to the baseline sound reports contained in Volume 5: Appendix SV-002, which also describes how these are linked to baseline levels at assessment locations. | High Speed Two (HS2) Ltd |  |
| Committed developments   | This informs the assessment of the future baseline.  A development consent or allocation that has full or outline planning permission, or is allocated in an adopted development plan.   | High Speed Two (HS2) Ltd | © Crown copyright. Reproduced by permission of Ordnance Survey Licence Number 100049190. Year of Publication 2015. |
| Community forum boundary   | The Environmental Statement has been split into 26 sections called Community Forum Areas.  | High Speed Two (HS2) Ltd | © Crown copyright. Reproduced by permission of Ordnance Survey Licence Number 100049190. Year of Publication 2015. |
| Construction airborne sound and vibration assessment location        | Locations at which a quantitative assessment of construction noise and vibration impacts of the Proposed Scheme has been carried out. These are labelled with an assessment location reference code to enable cross-reference to the construction sound & vibration reports contained in Volume 5: Appendix SV-003.  | High Speed Two (HS2) Ltd |  |
| Construction airborne sound assessment location                      | Locations at which a quantitative assessment of construction noise impacts of the Proposed Scheme has been carried out. These are labelled with an assessment location reference code to enable cross-reference to the construction sound & vibration reports contained in Volume 5: Appendix SV-003.  | High Speed Two (HS2) Ltd |  |

| Legend features  | Definition   | Source                   | Copyright  |
|--|--|--------------------------|--|
| Construction vibration assessment locations                                  | Locations at which a quantitative assessment of construction vibration impacts of the Proposed Scheme has been carried out. These are labelled with an assessment location reference code to enable cross-reference to the construction sound & vibration reports contained in Volume 5: Appendix SV-003.  | High Speed Two (HS2) Ltd |  |
| County boundary  | County boundaries from Ordnance Survey boundary mapping.   | Ordnance Survey          | © Crown copyright. Reproduced by permission of Ordnance Survey Licence Number 100049190. Year of Publication 2015. |
| Depot, station, headhouse or portal building                                 | Extends to cover operational footprint of each depot and station and the footprint of each tunnel vent shaft and headhouse at surface level. Excludes any ancillary buildings associated with these structures.  | High Speed Two (HS2) Ltd |  |
| District/Borough boundary  | Ordnance Survey local authority boundary mapping.  | Ordnance Survey          | © Crown copyright. Reproduced by permission of Ordnance Survey Licence Number 100049190. Year of Publication 2015. |
| Engineering earthworks: Cutting  | Cuttings created in the construction of the railway and associated works such as highways.   | High Speed Two (HS2) Ltd |  |
| Engineering earthworks: Embankment   | Embankments created in the construction of the railway and associated works such as highways.  | High Speed Two (HS2) Ltd |  |
| Envisaged measures further reducing noise effects                            | Other environmental features e.g. landscaping: These lines represent environmental mitigation features provided for reasons other than noise mitigation which also reduce sound levels from the Proposed Scheme to the surrounding environment. These features are not placed specifically to reduce or remove a likely significant noise effect. Examples include landscaping and visual mitigation earthworks (non-engineering earthworks).  Engineering e.g. cuttings: These lines represent engineering features which reduce sound levels from the Proposed Scheme to the surrounding environment but are not placed specifically to reduce or remove a likely significant noise effect. Examples include cuttings and safety barriers on viaducts which are not close to sensitive receptors.  | High Speed Two (HS2) Ltd |  |
| Envisaged mitigation to avoid / reduce significant noise effects             | Landscaping and/or fence barriers: These lines represent the envisaged mitigation provided specifically to reduce sound levels from the Proposed Scheme at sensitive receptors in order to reduce or remove likely operational significant noise effects. Examples include noise fence barriers or earth bunds (non-engineering earthworks) acting as noise barriers. These features are labelled with the height of the top of the barrier/bund above rail level.  Engineering e.g. cuttings (green tunnels separately marked): These lines represent engineering features of the route which reduce sound levels from the Proposed Scheme at potentially significant sensitive receptors. These features, therefore, serve a material purpose in reducing or avoiding likely significant noise effects. Examples include engineering cuttings near to sensitive receptors. These features are labelled with the height of the top of the feature above rail level. | High Speed Two (HS2) Ltd |  |
| Ground-borne sound & vibration study area (highly sensitive non-residential) | This defines the area within which direct operational ground-borne sound and vibration impacts of the scheme at highly sensitive non-residential receptors have been quantitatively assessed. This area is defined as within 200m of the route.  | High Speed Two (HS2) Ltd |  |
| Ground-borne sound & vibration study area (residential and non-residential)  | This defines the area within which direct operational ground-borne sound and vibration impacts of the scheme at residential and non-residential receptors have been quantitatively   | High Speed Two (HS2) Ltd |  |

| Legend features   | Definition   | Source                   | Copyright |
|---|--|--------------------------|-----------|
|   | assessed. This area is defined as within 85m of the route.   |                          |           |
| Ground-borne sound and/or vibration assessment location   | Locations near tunnelled sections of the route at which a quantitative assessment of ground-borne sound and vibration impacts due to the operation of the Proposed Scheme has been carried out. These are labelled with an assessment location reference code to enable cross-reference to the operational sound & vibration reports contained in Volume 5: Appendix SV-004.   | High Speed Two (HS2) Ltd |           |
| Minor ground-borne noise or vibration impact  | Buildings at which a minor operational ground-borne sound or vibration impact is predicted from the Proposed Scheme.   | High Speed Two (HS2) Ltd |           |
| Non engineering earthworks: Cutting   | Cuttings created in the construction of landscape features and mitigation measures.  | High Speed Two (HS2) Ltd |           |
| Non engineering earthworks: Embankment  | Embankments created in the construction of landscape features and mitigation measures.   | High Speed Two (HS2) Ltd |           |
| Operational airborne sound impacts at buildings   | The buildings shown on SV-o2 and SV-o5 are colour-coded according to the magnitude of the predicted noise impacts of the Proposed Scheme. Noise impacts are calculated by comparing the sound levels predicted if the Proposed Scheme did not go ahead with those if it did (details of this process can be found in Volume 5: Appendix SVoo1-ooo). Panel B on SV-o2/SV-o5 contains a key showing the colours used with the corresponding impact categories. The impacts presented are the greatest (i.e. worst-case) of the impacts predicted for daytime and night-time. | High Speed Two (HS2) Ltd |           |
| Potential additional noise insulation (triggered by maximum sound levels at night)                | This represents dwellings which would potentially be provided with noise insulation due maximum sound levels from the Proposed Scheme (further information regarding assessment criteria can be found in Volume 5 Appendix SV-001).  | High Speed Two (HS2) Ltd |           |
| Potential additional noise insulation (triggered by WHO<br>Night Noise Guidelines Interim Target) | This represents dwellings which would potentially be provided with noise insulation due to noise from the Proposed Scheme exceeding the World Health Organization (WHO) night noise guidelines interim target (further information regarding assessment criteria can be found in Volume 5 Appendix SV-001).  | High Speed Two (HS2) Ltd |           |
| Potential noise insulation (triggered by Noise Insulation Regulations 1996)                       | This represents dwellings which would potentially qualify for noise insulation under the Noise Insulation (Railways and Other Guided Transport Systems) Regulations 1996 (further information regarding assessment criteria can be found in Volume 5 Appendix SV-001).   | High Speed Two (HS2) Ltd |           |
| Route in tunnel<br>Route on surface   | Represents the proposed route of HS2, split into route on surface and tunnelled sections.  | High Speed Two (HS2) Ltd |           |
| Sound Contours (SV-01)  | The sound levels from the Proposed Scheme (expressed as $L_{pAeq,T}$ and representing sound from the new railway only) are presented in 5 dB steps. The levels are shown in the panel in the top-right hand corner of SV-o1.   | High Speed Two (HS2) Ltd |           |
| Sound contours (SV-02/SV-05)  | The sound levels from the Proposed Scheme (expressed as $L_{pAeq,T}$ and representing sound from the new railway only) are presented at two sound levels: 40 dB $L_{Aeq,T}$ 23:00 to 07:00 and 55 dB $L_{Aeq,T}$ 23:00 to 07:00. The corresponding daytime levels ( $L_{Aeq,T}$ 07:00 to 23:00) are shown in Panel A of SV-02/SV-05.   | High Speed Two (HS2) Ltd |           |

Supplementary Environmental Statement and Additional Provision 2 Environmental Statement

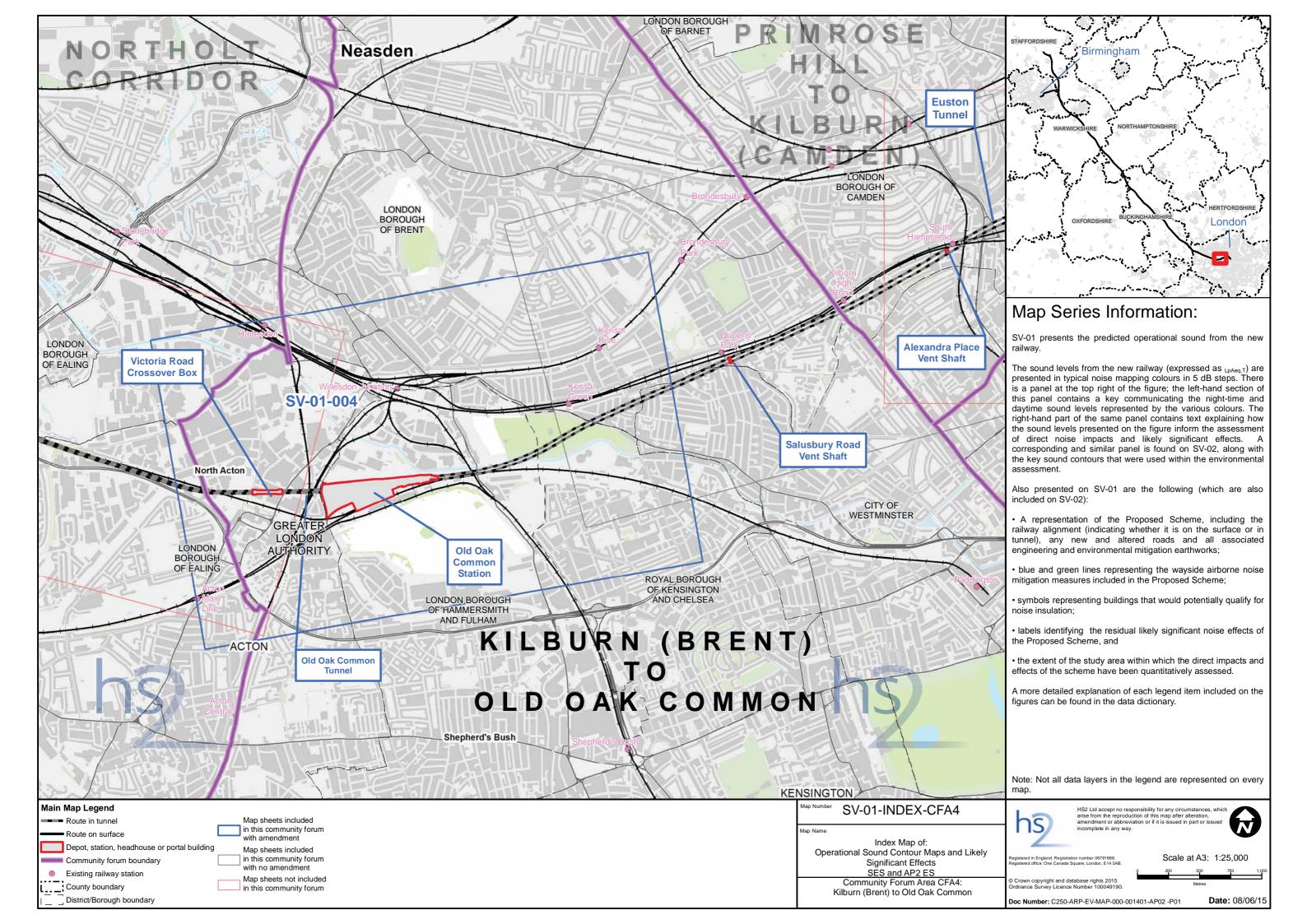
Volume 5 | CFA4 | Kilburn (Brent) to Old Oak Common

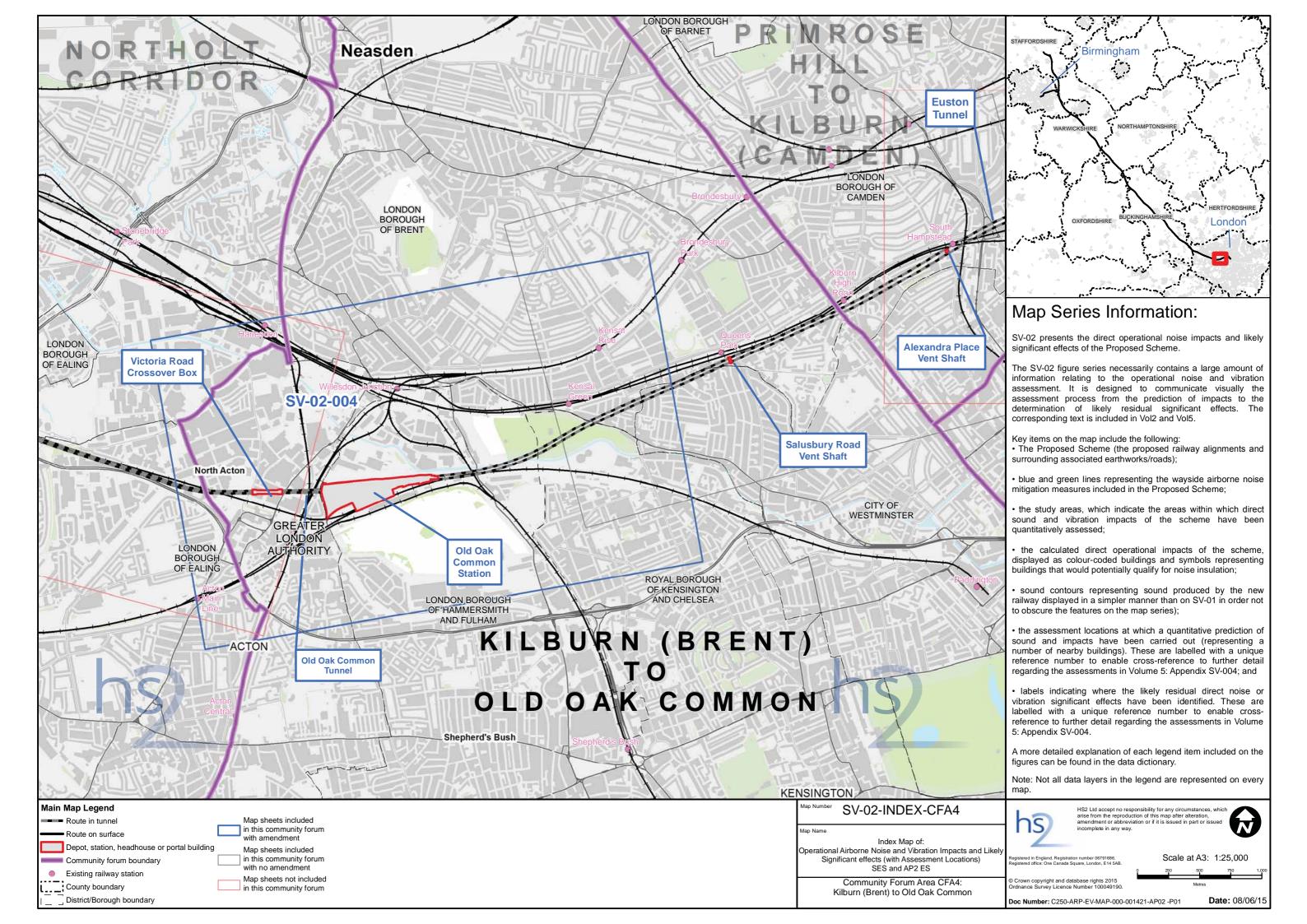
SV-01 – Operational Sound Contour Maps and Likely Significant Effects

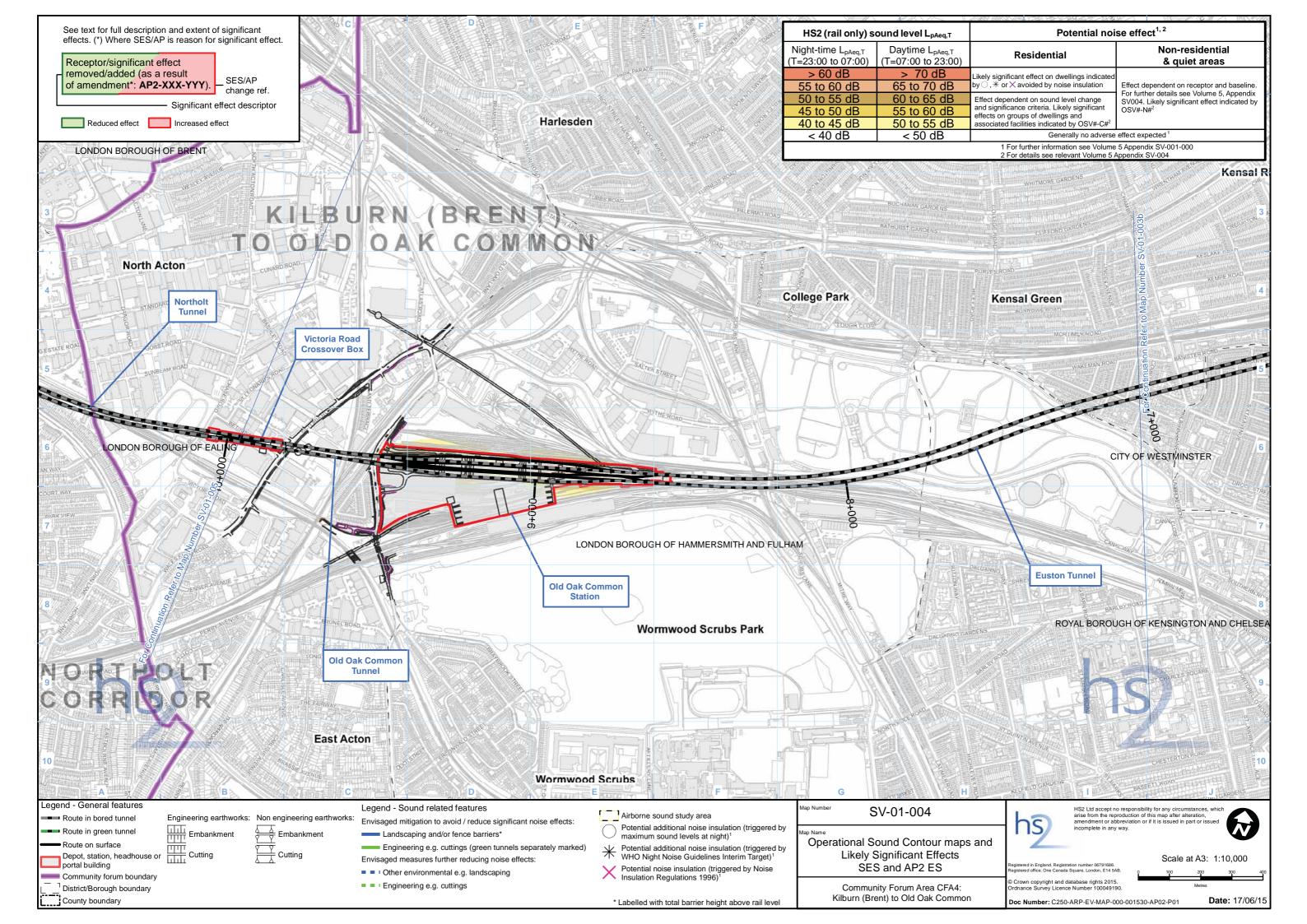
SV-02 – Operational Airborne Noise and Vibration Impacts and Likely Significant Effects (with Assessment Locations)

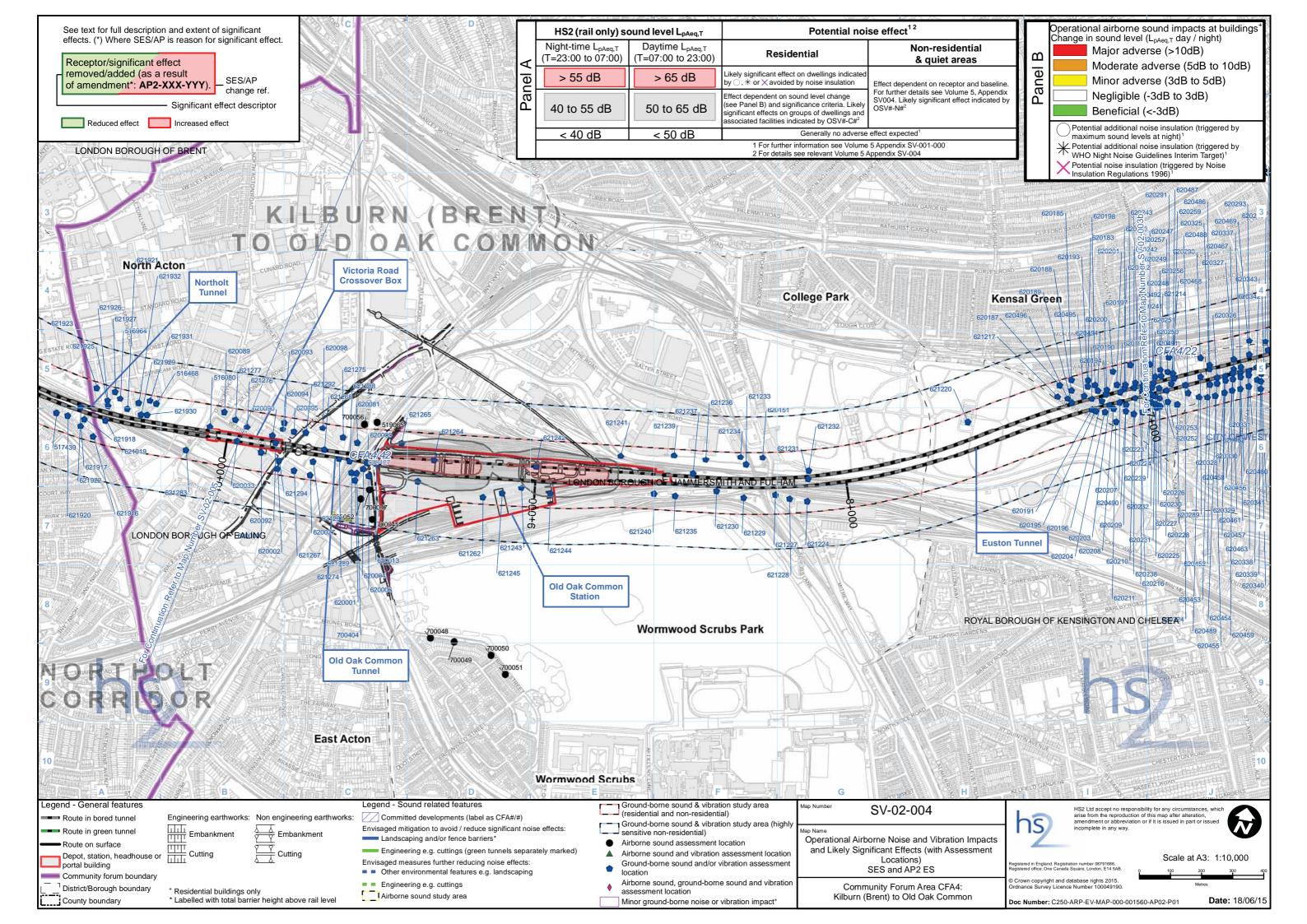
SV-03 – Assessment and Monitoring Locations for Construction Sound, Noise & Vibration Assessments

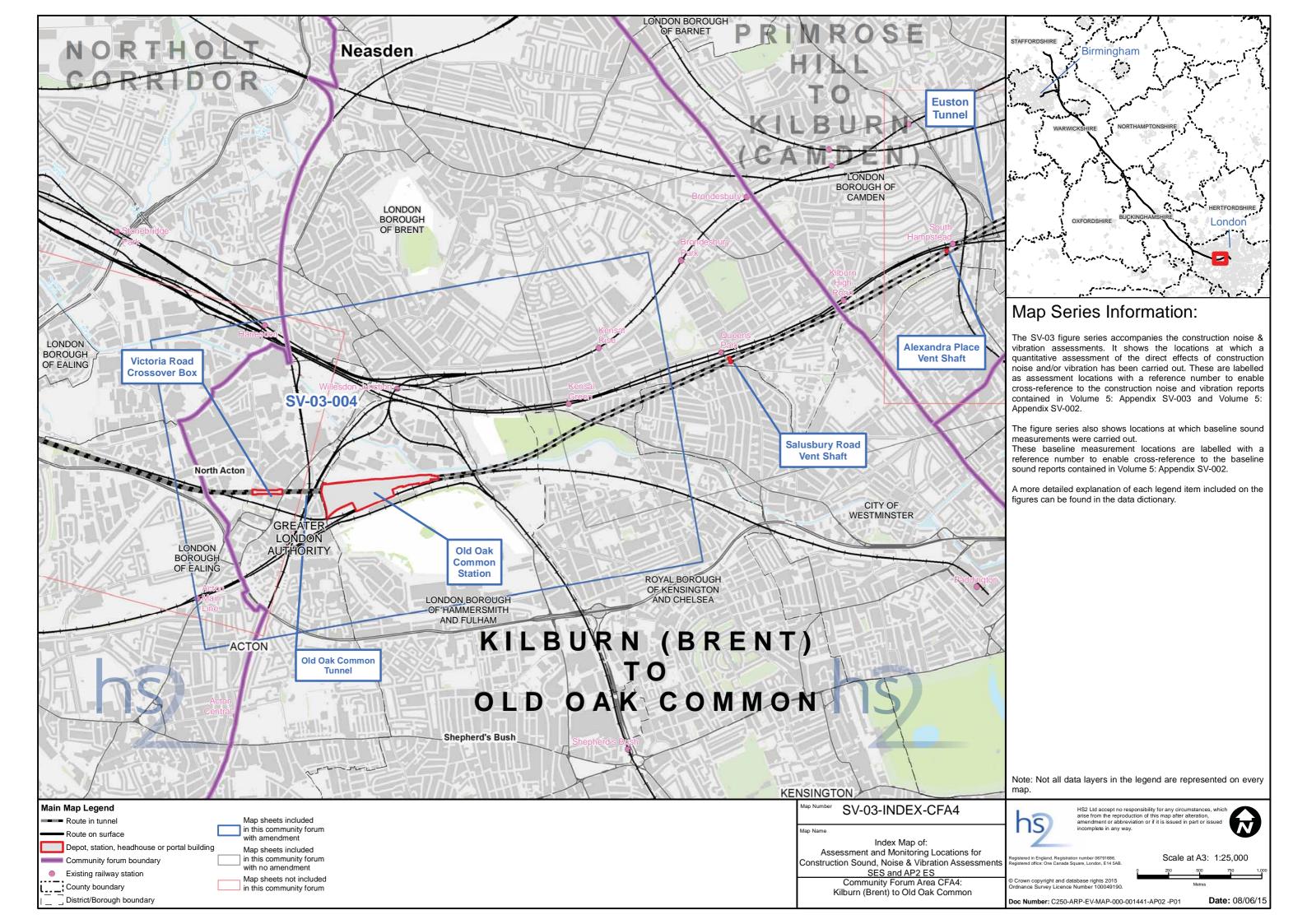
SV-04 – Assessment and Monitoring Locations for Operational Sound, Noise & Vibration Assessments

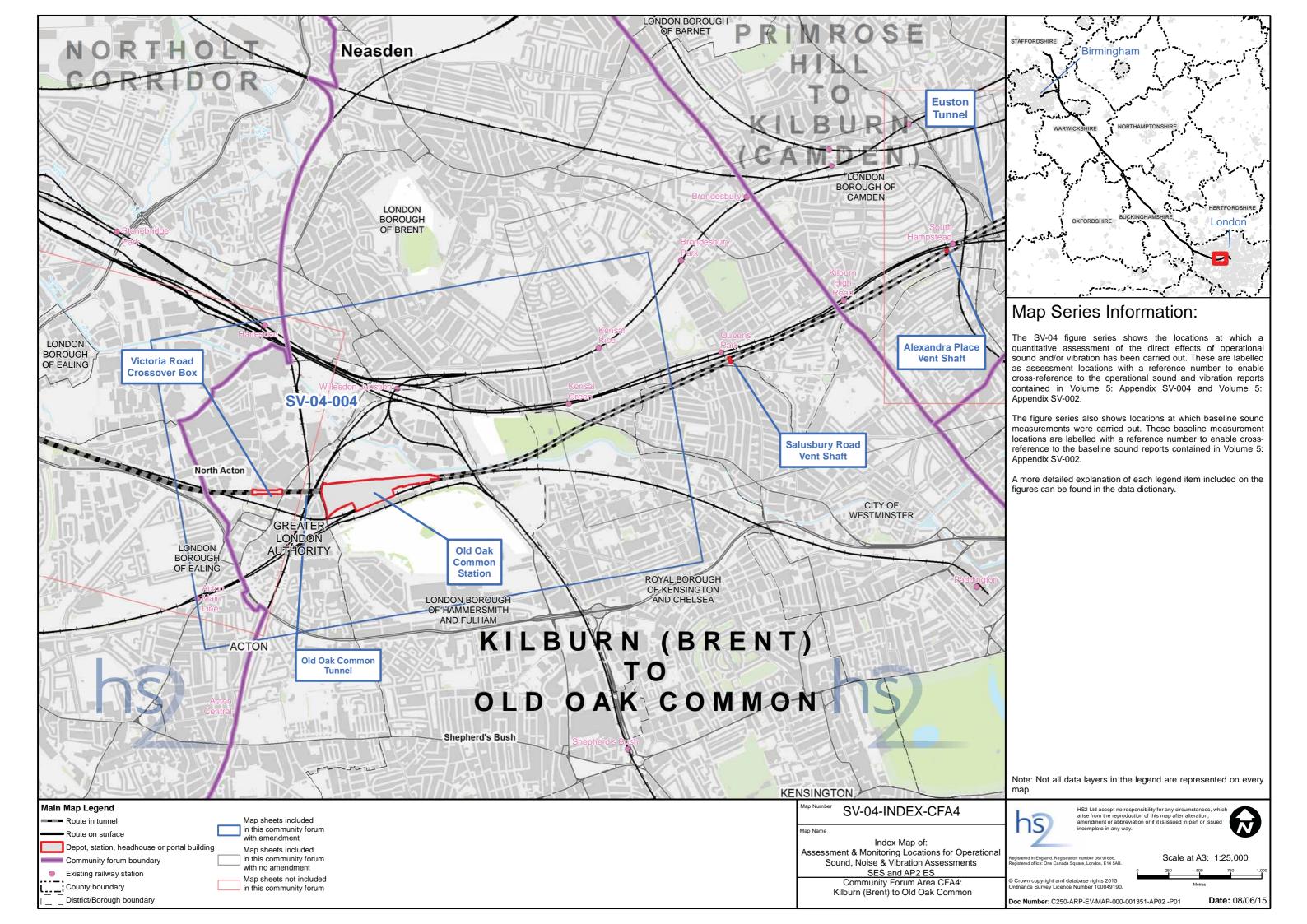


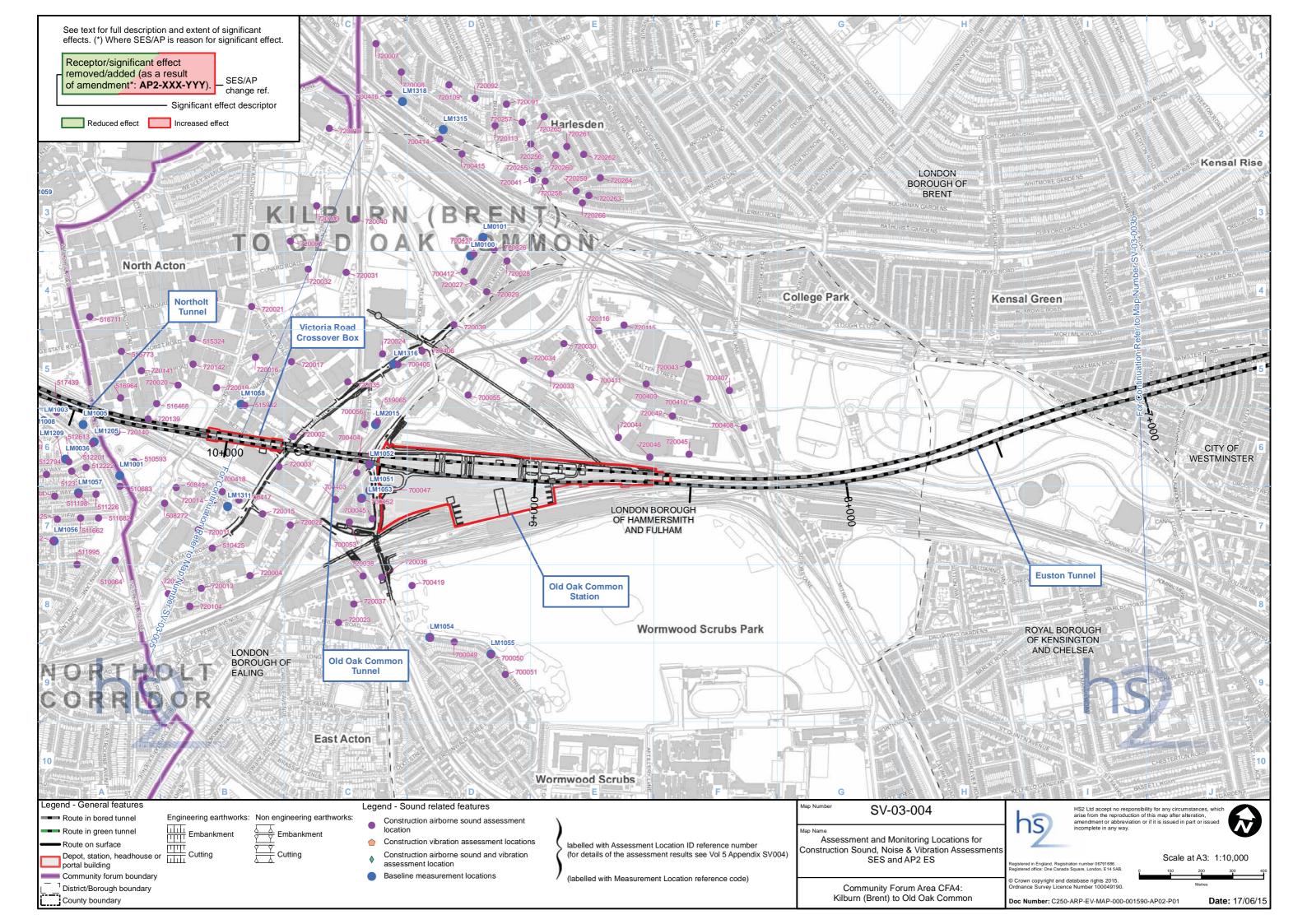


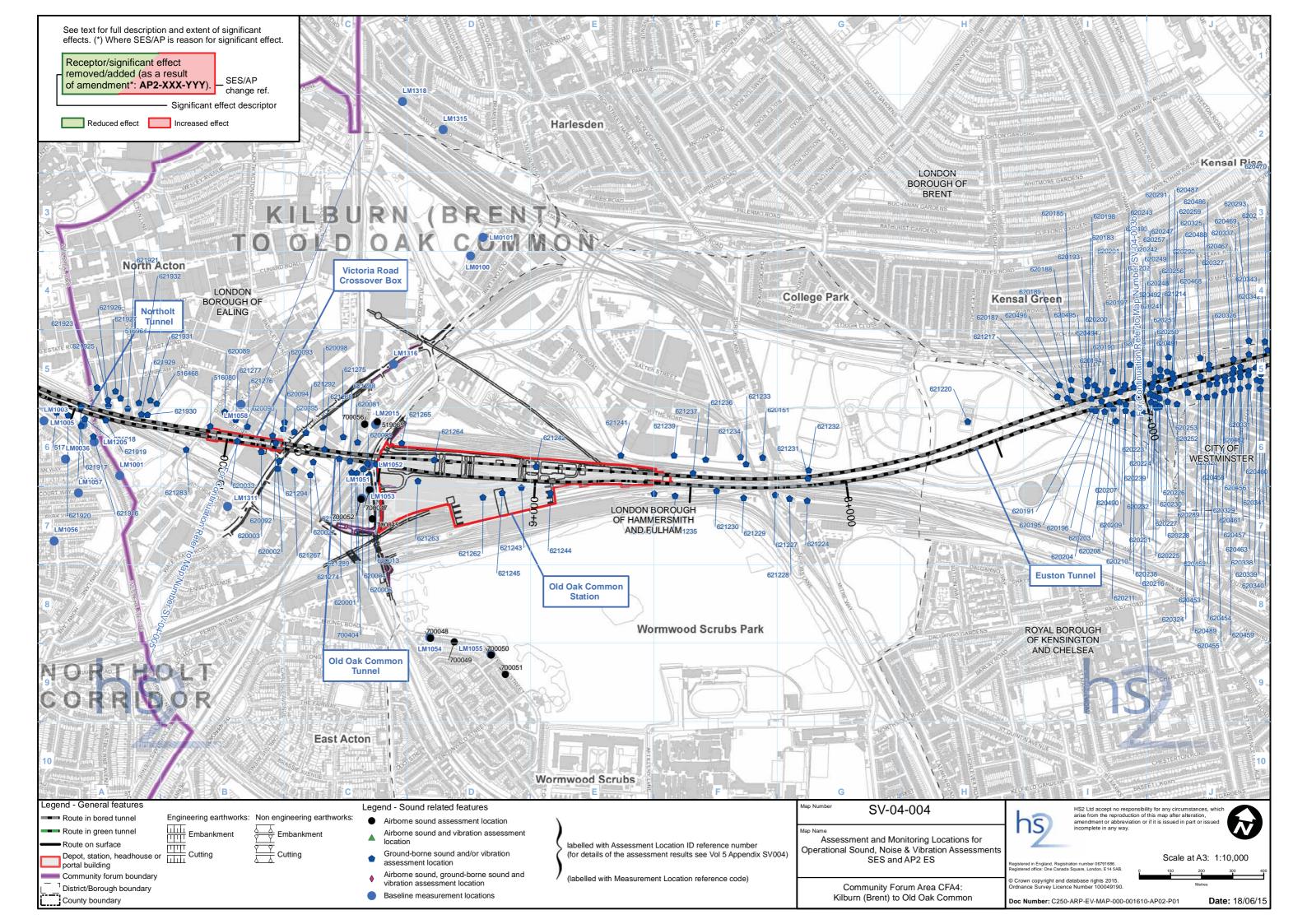


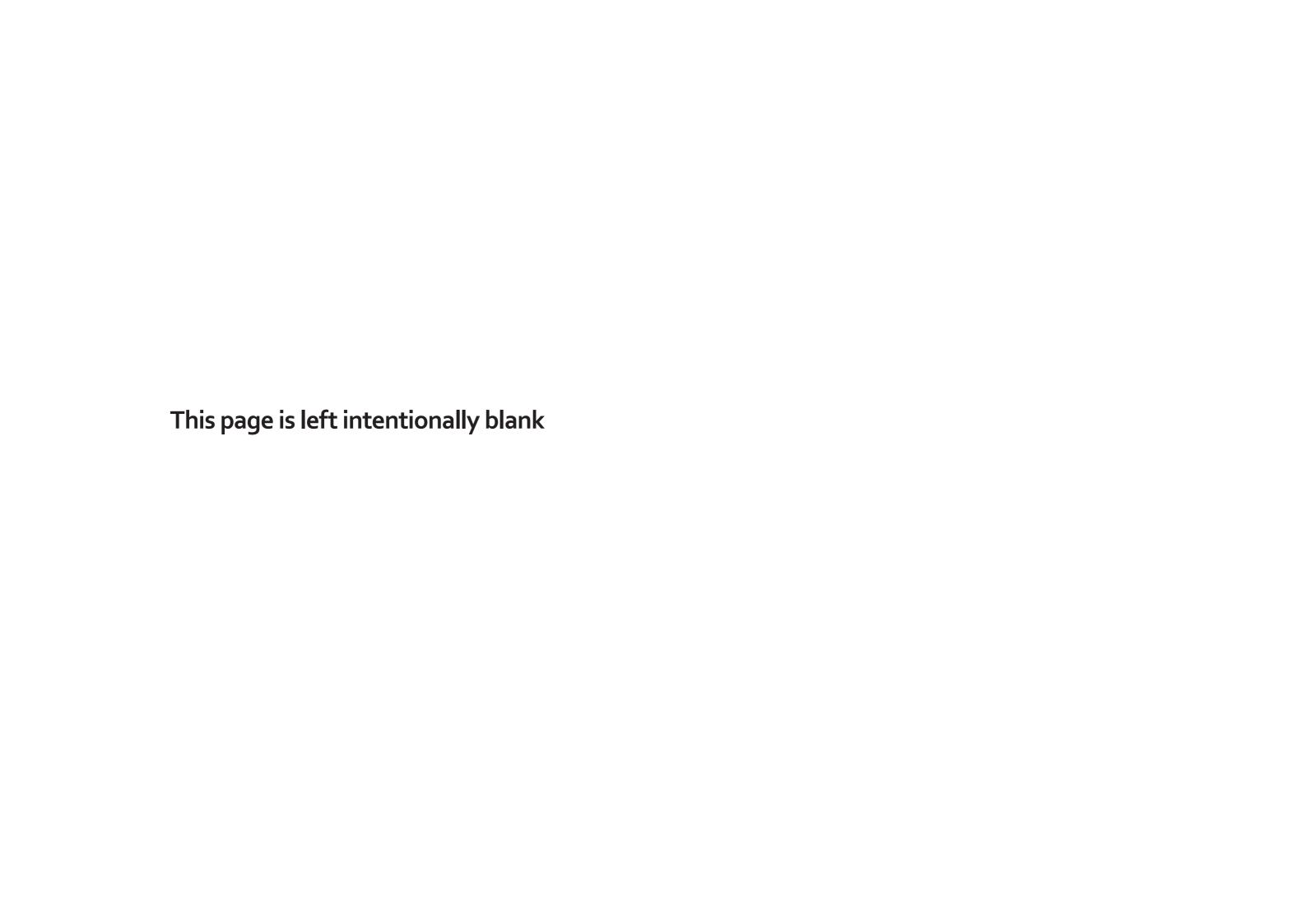










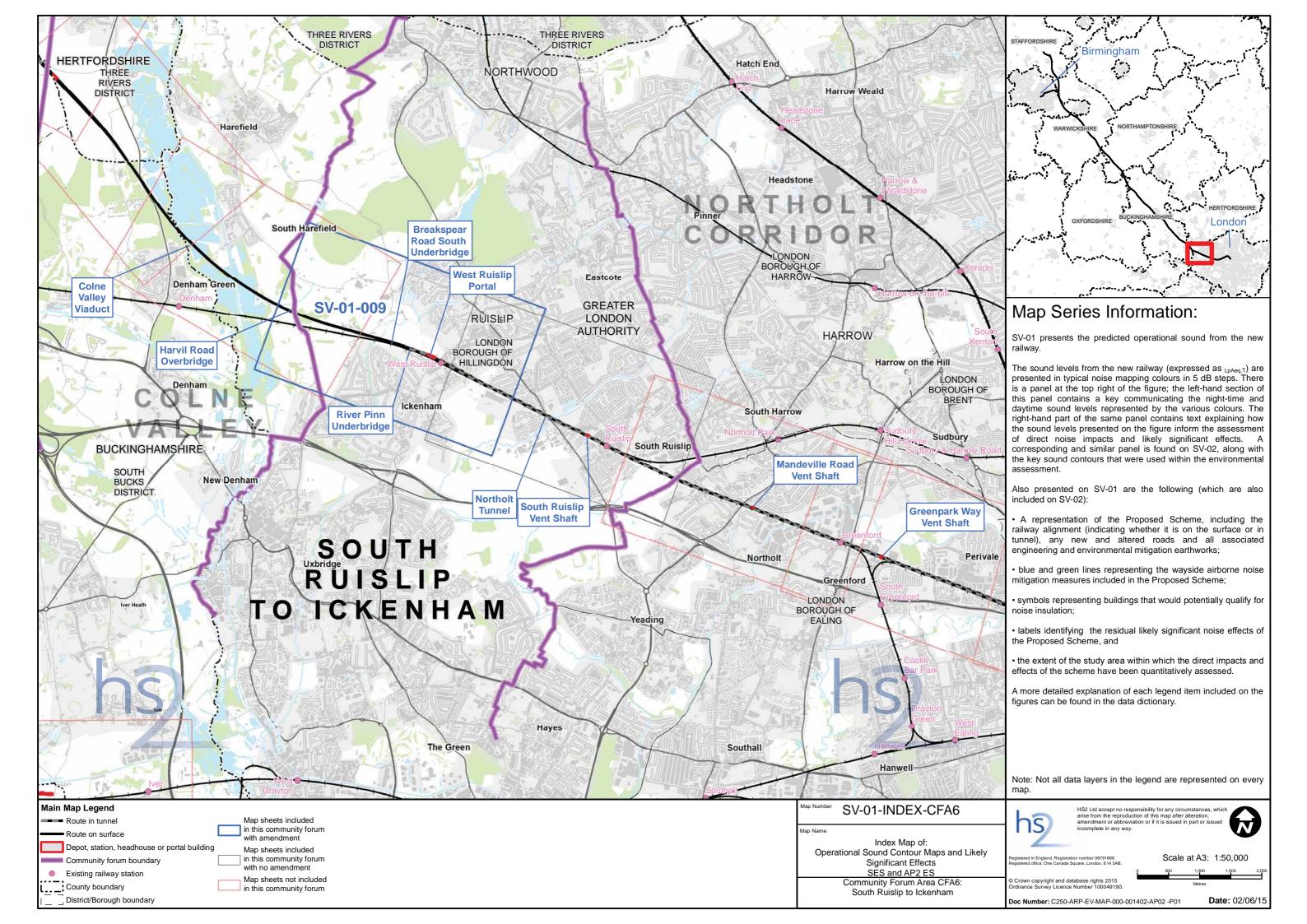


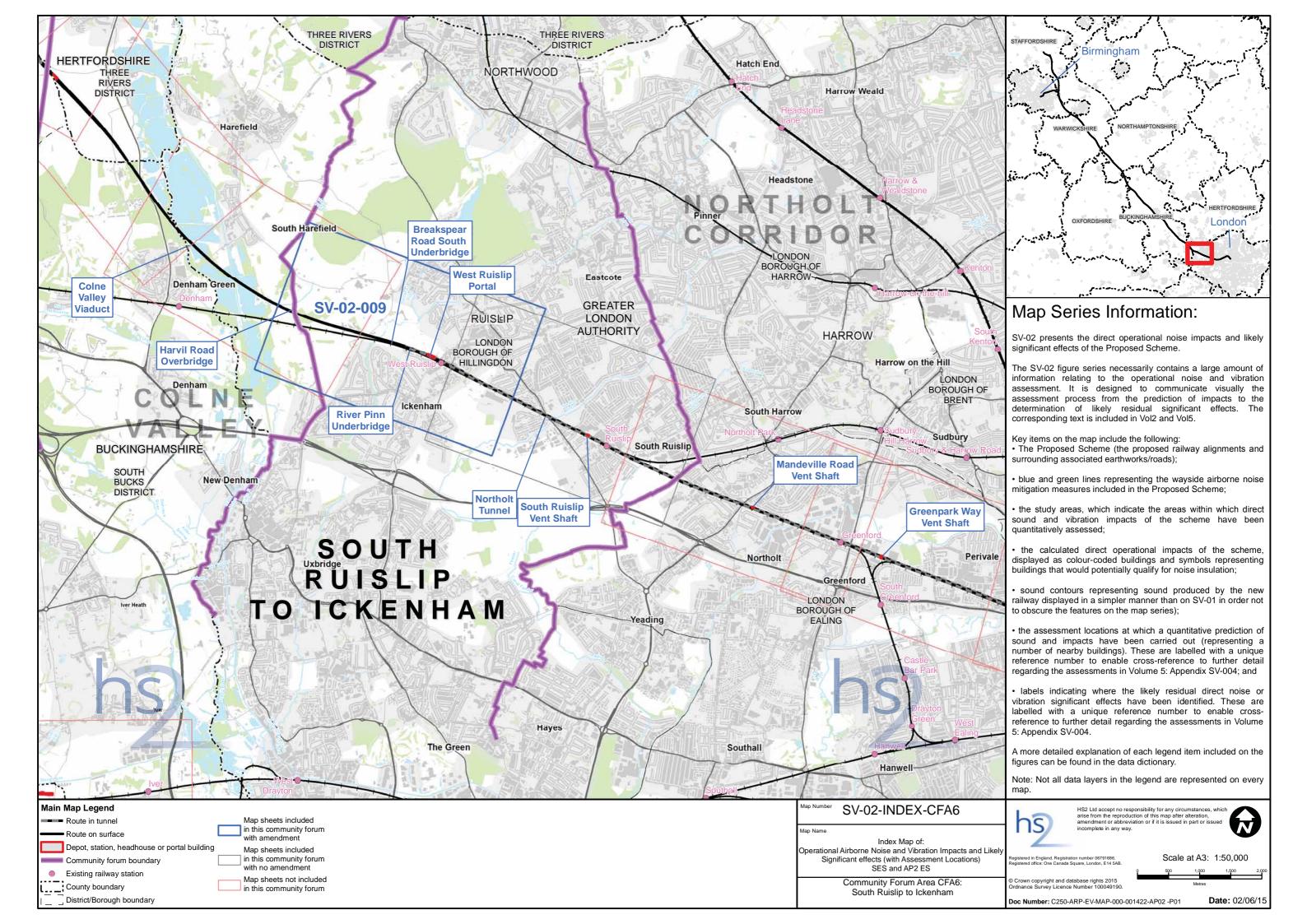
Supplementary Environmental Statement and Additional Provision 2 Environmental Statement

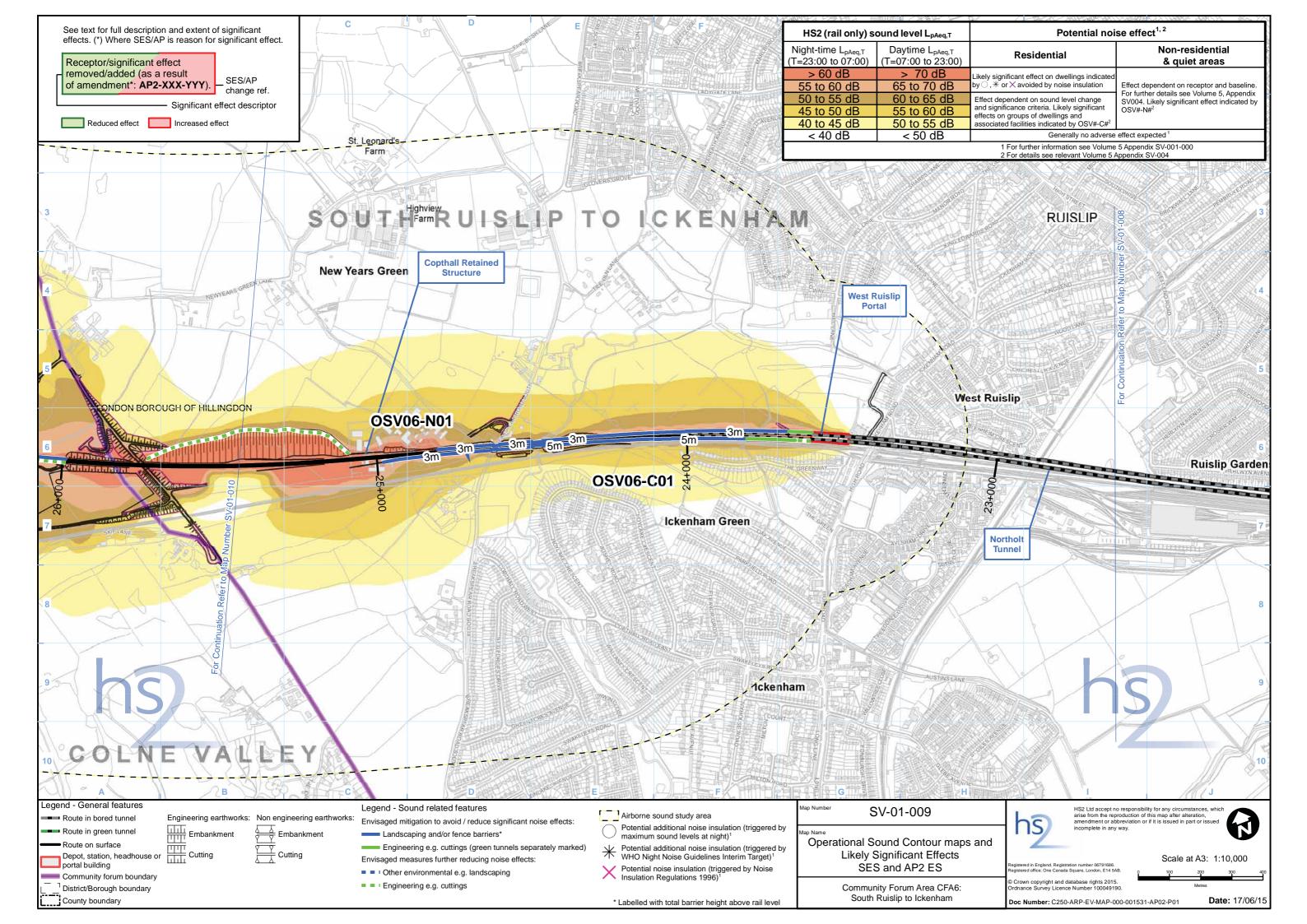
Volume 5 | CFA6 | South Ruislip to Ickenham

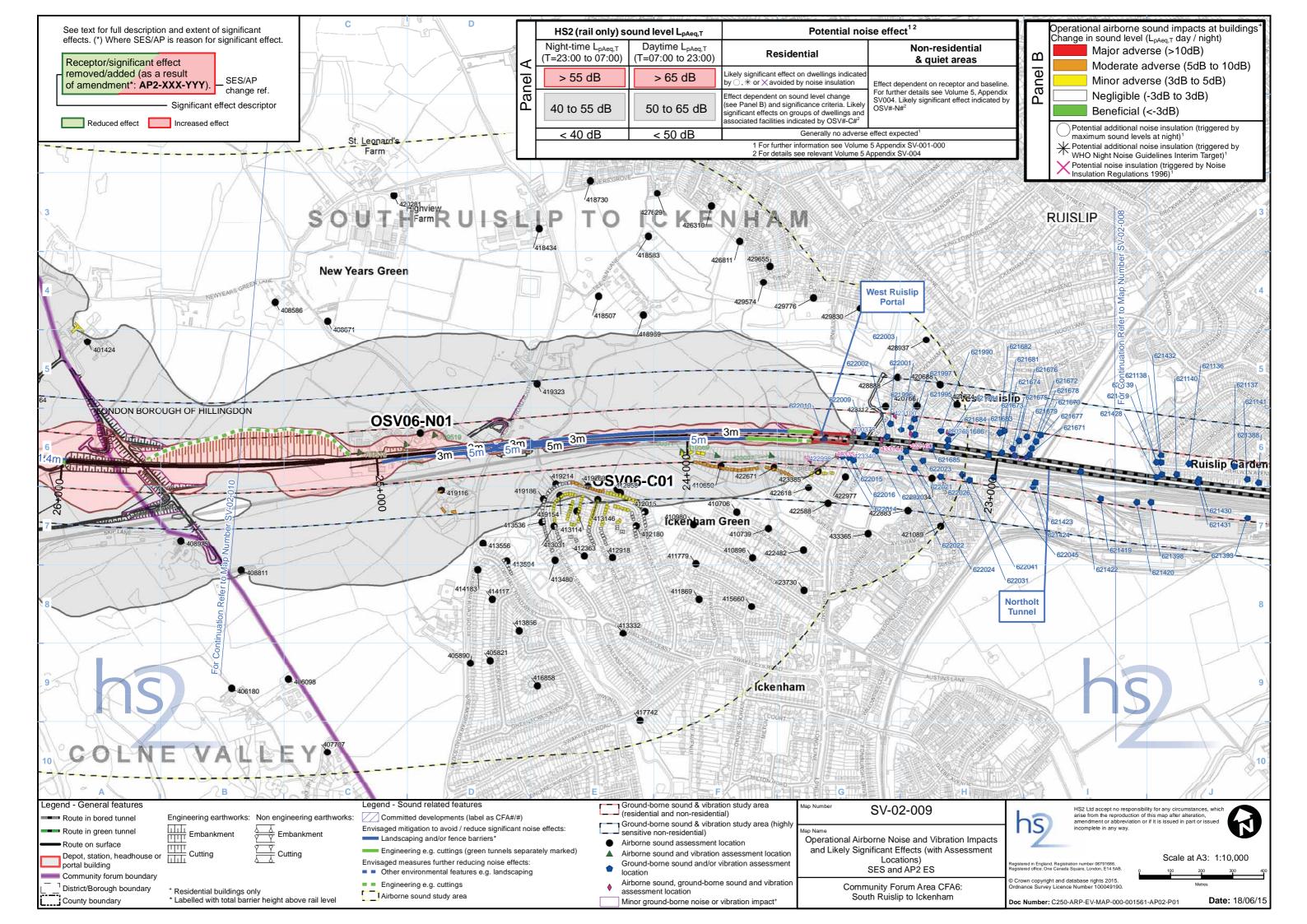
SV-01 – Operational Sound Contour Maps and Likely Significant Effects

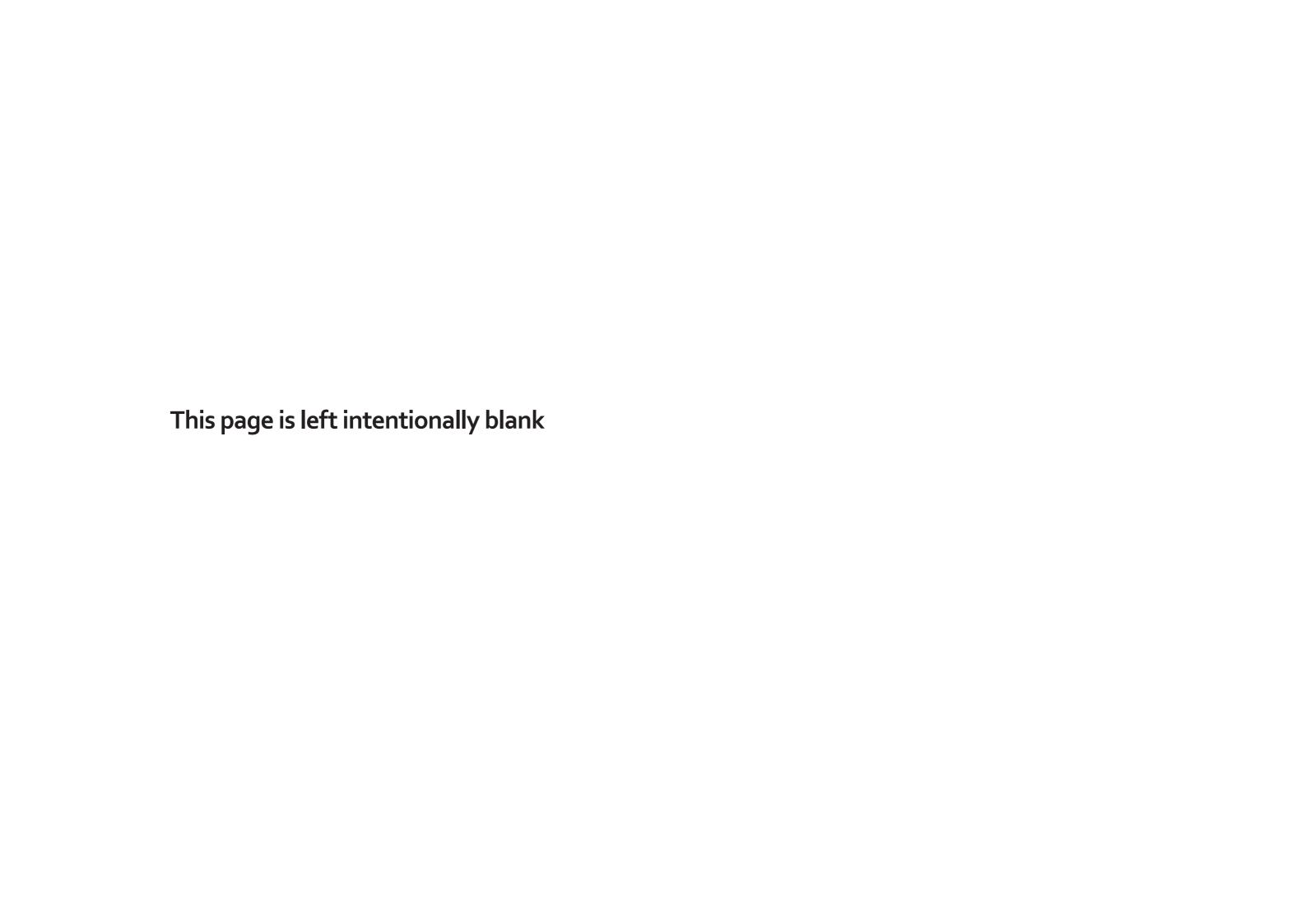
SV-02 – Operational Airborne Noise and Vibration Impacts and Likely Significant Effects (with Assessment Locations)









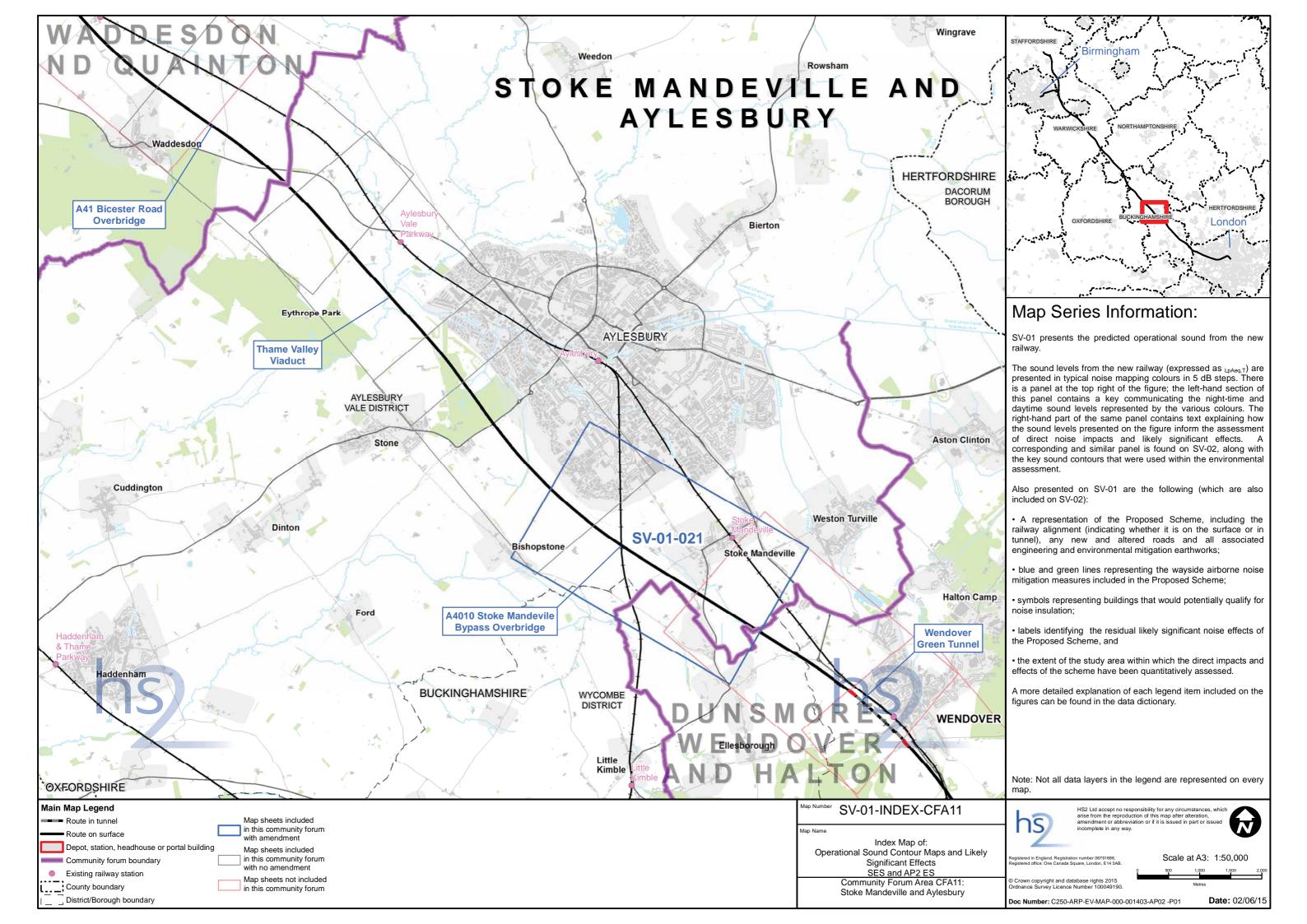


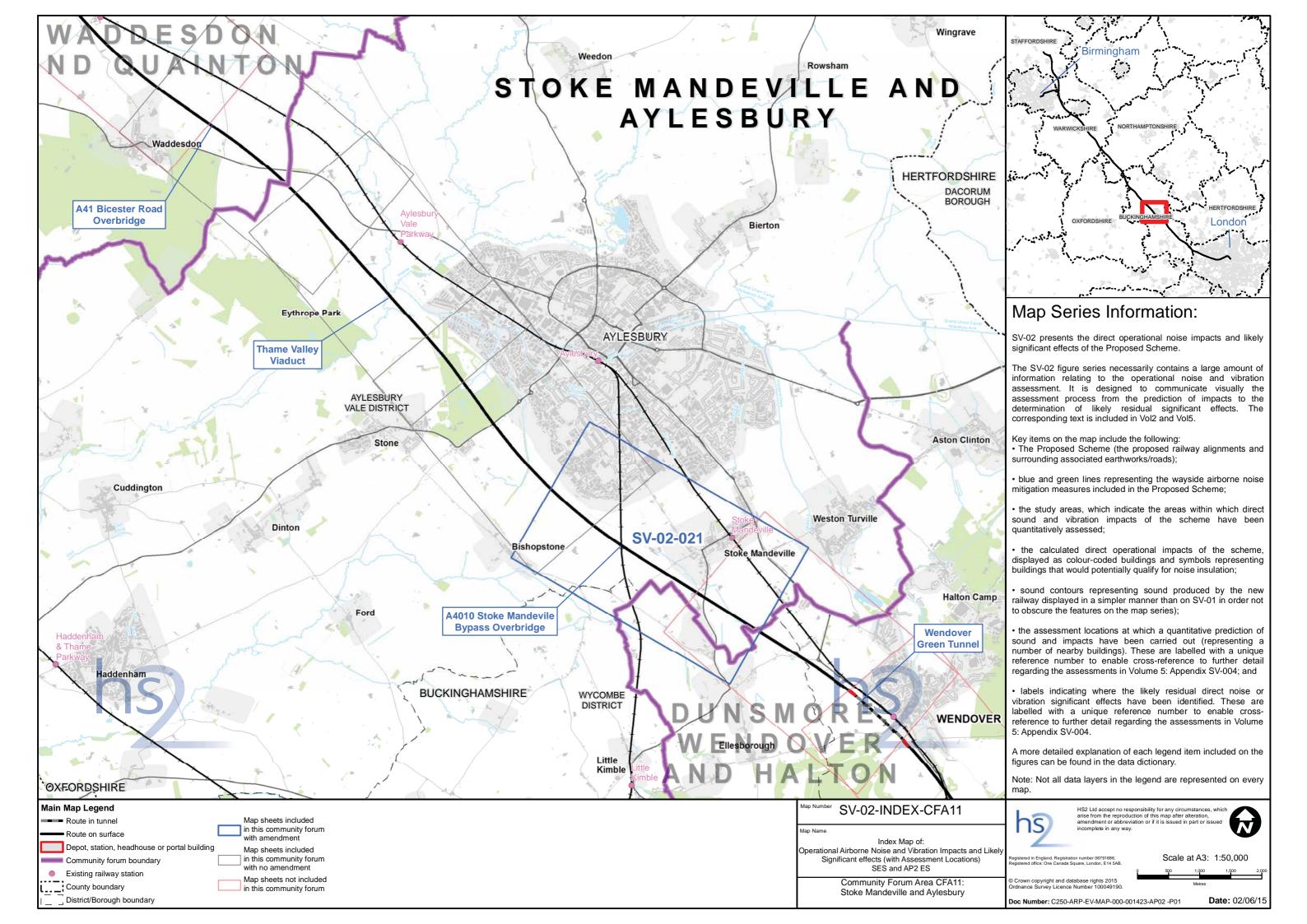
Supplementary Environmental Statement and Additional Provision 2 Environmental Statement

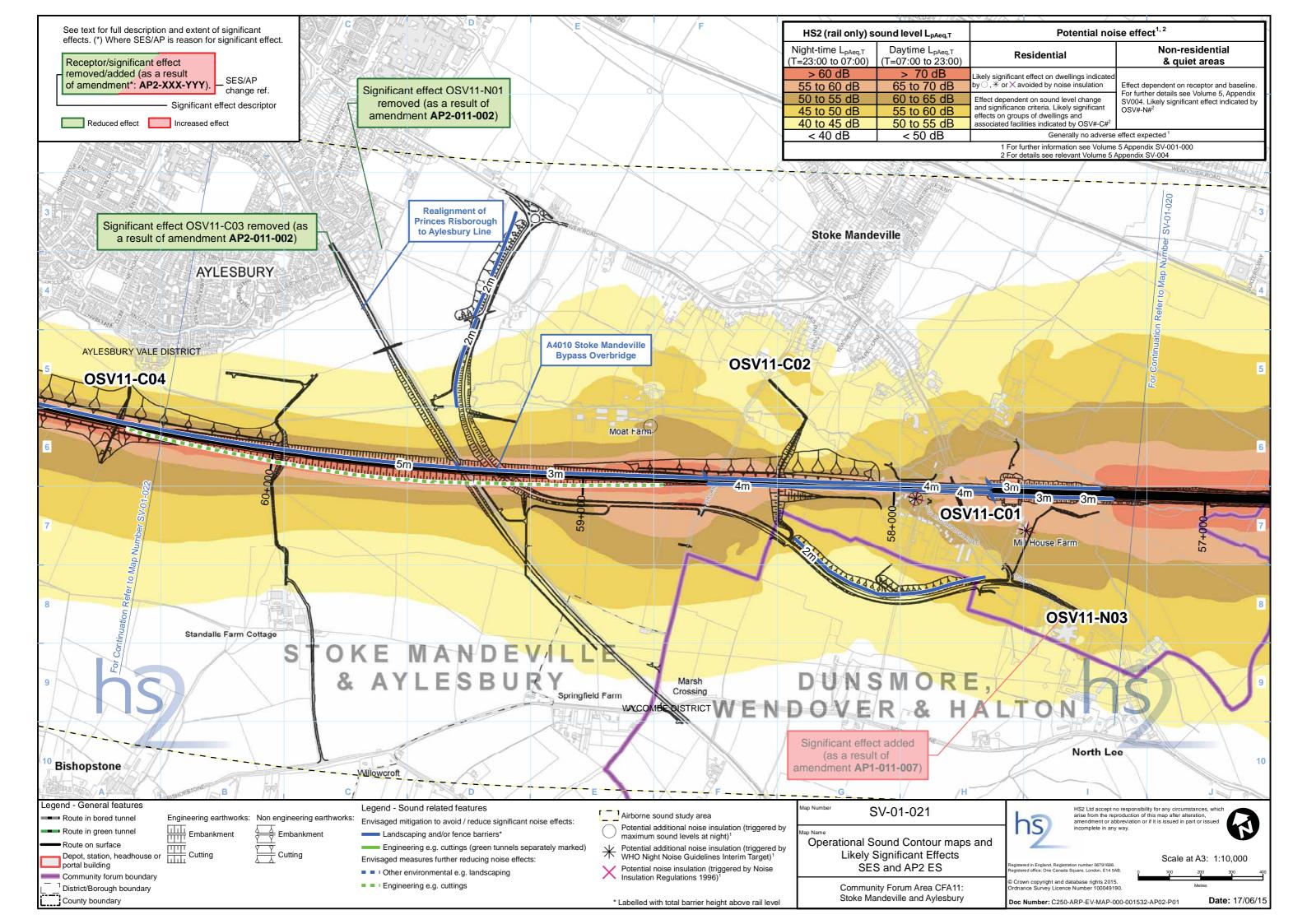
Volume 5 | CFA11 | Stoke Mandeville and Aylesbury

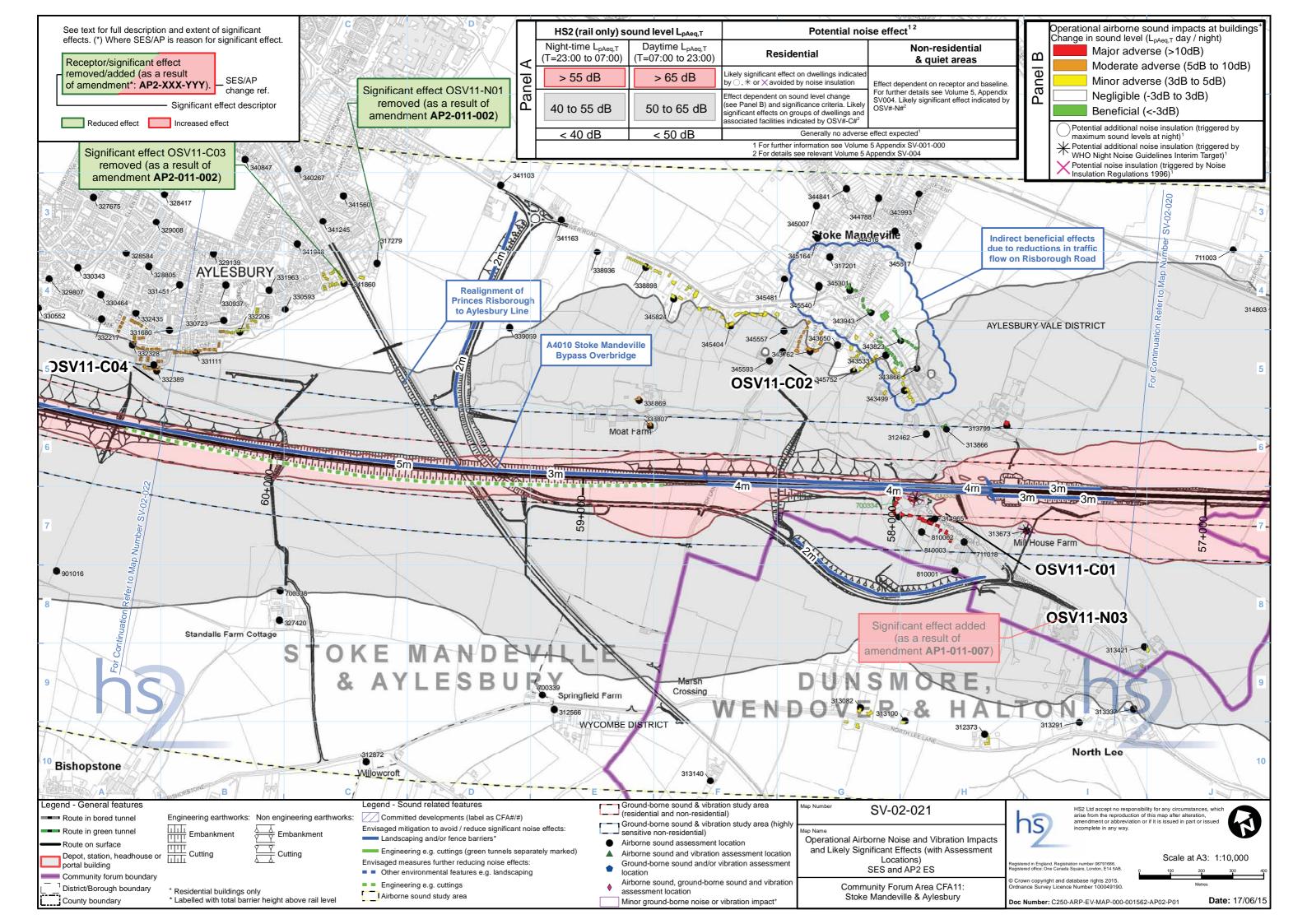
SV-01 – Operational Sound Contour Maps and Likely Significant Effects

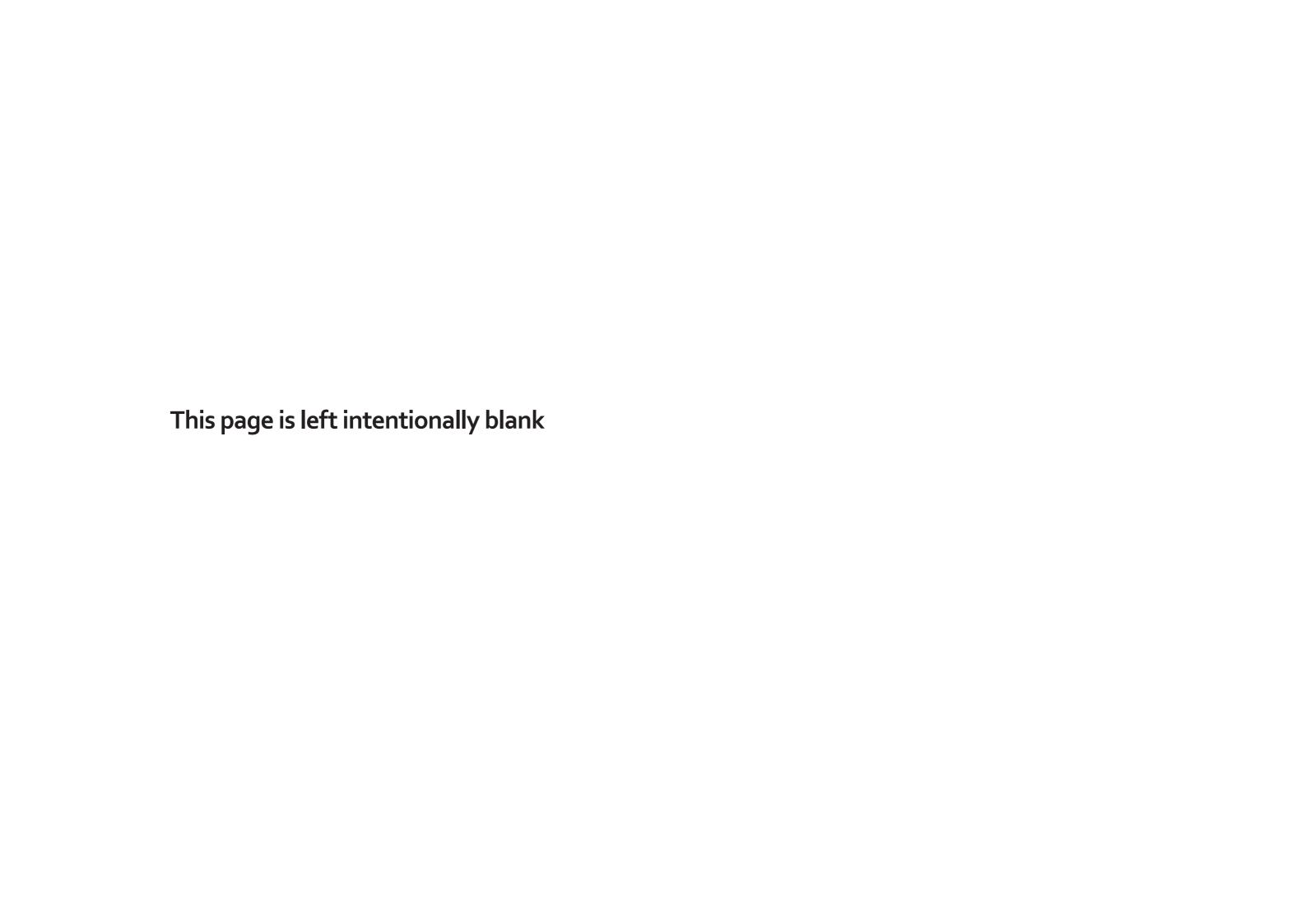
SV-02 – Operational Airborne Noise and Vibration Impacts and Likely Significant Effects (with Assessment Locations)











## HIGH SPEED RAIL (LONDON - WEST MIDLANDS)

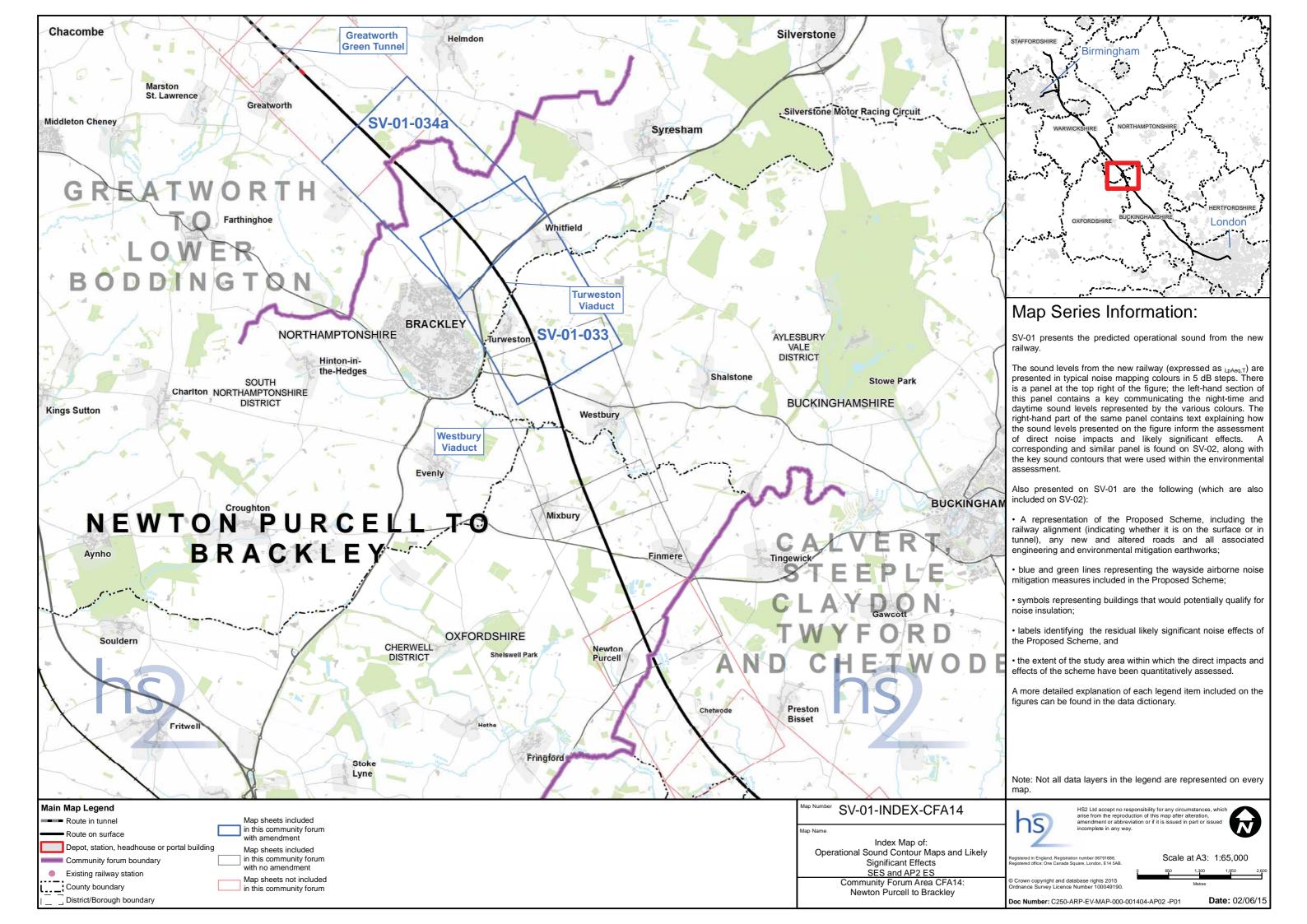
Supplementary Environmental Statement and Additional Provision 2 Environmental Statement

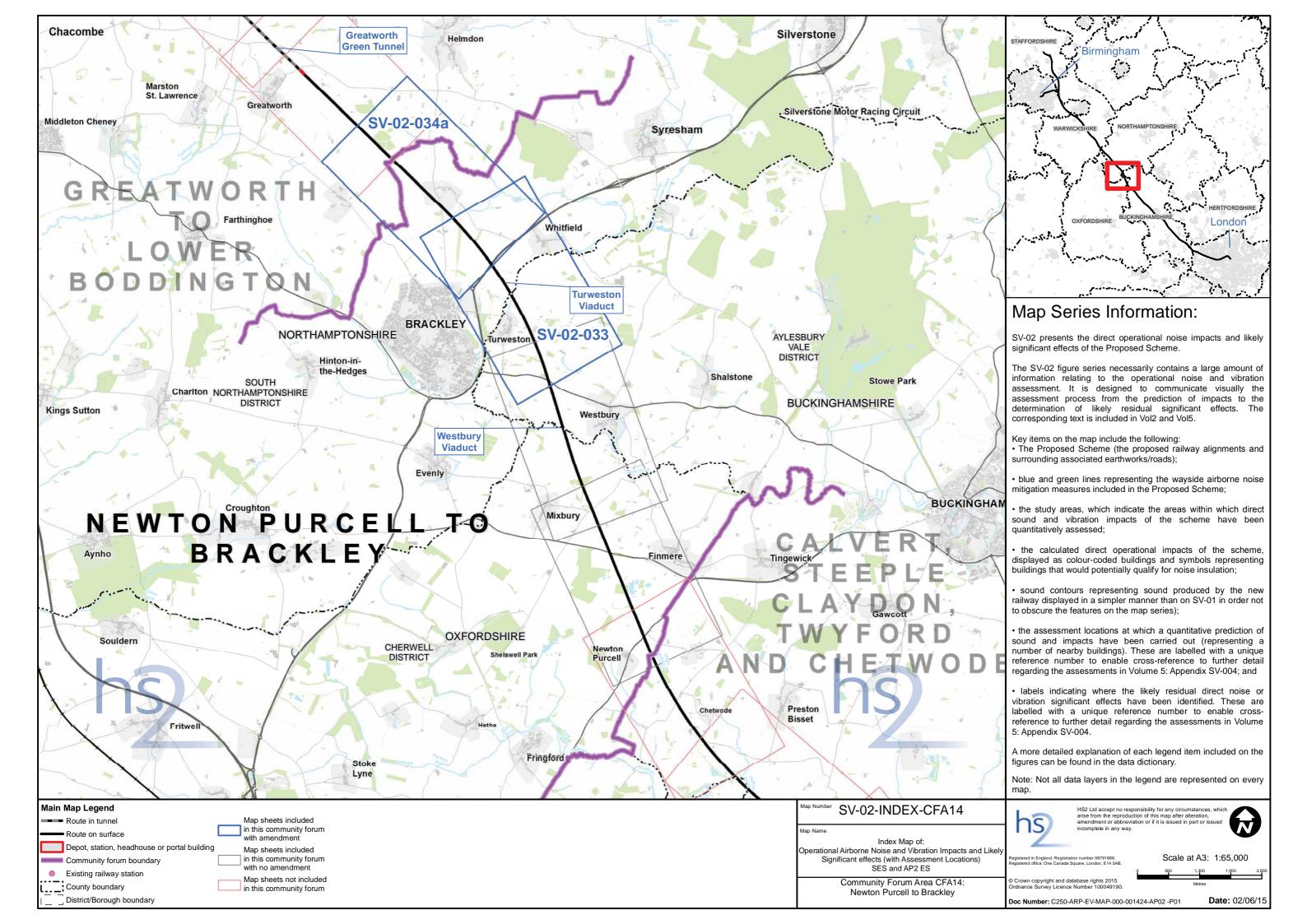
Volume 5 | CFA14 | Newton Purcell to Brackley

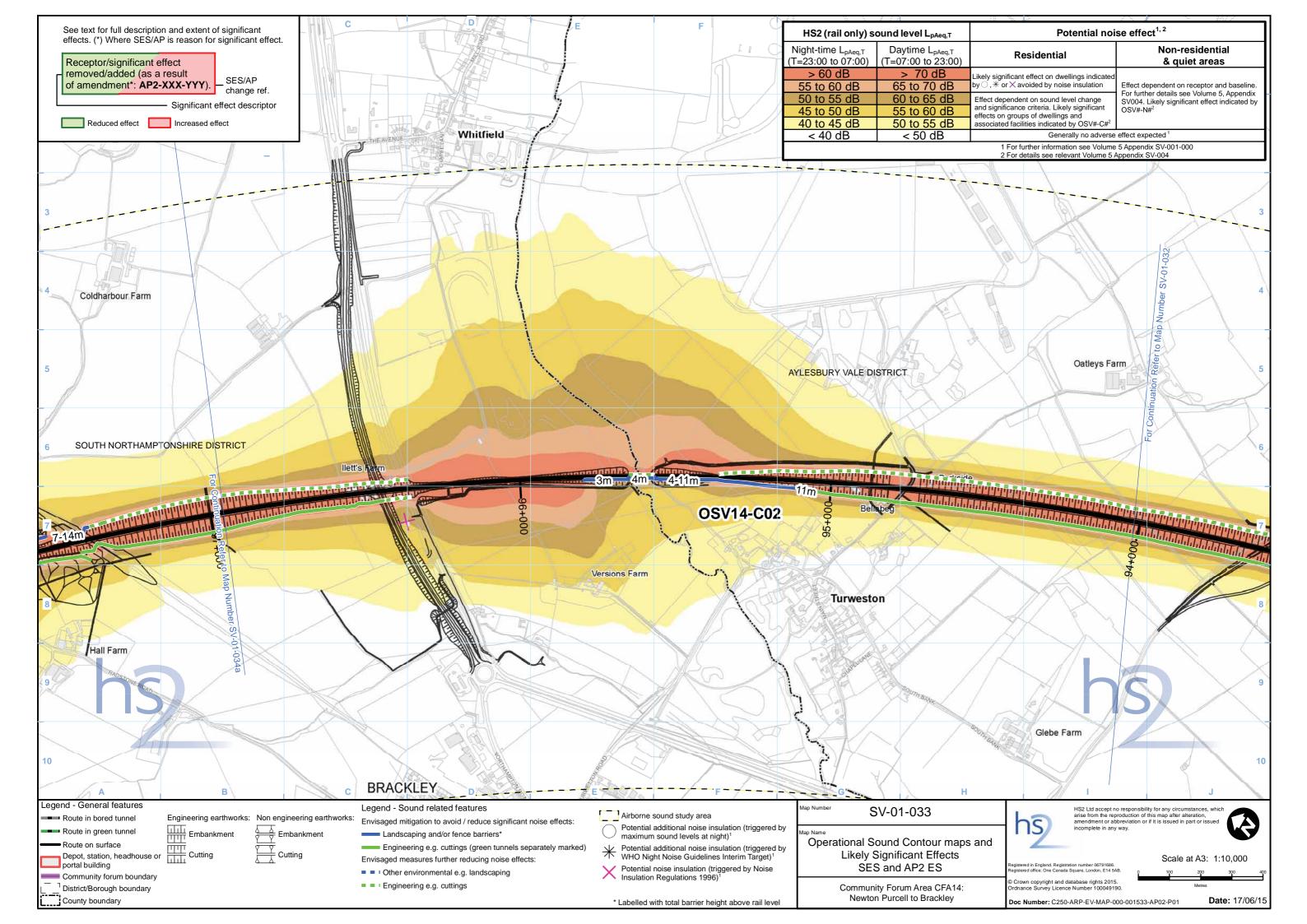
SV-01 – Operational Sound Contour Maps and Likely Significant Effects

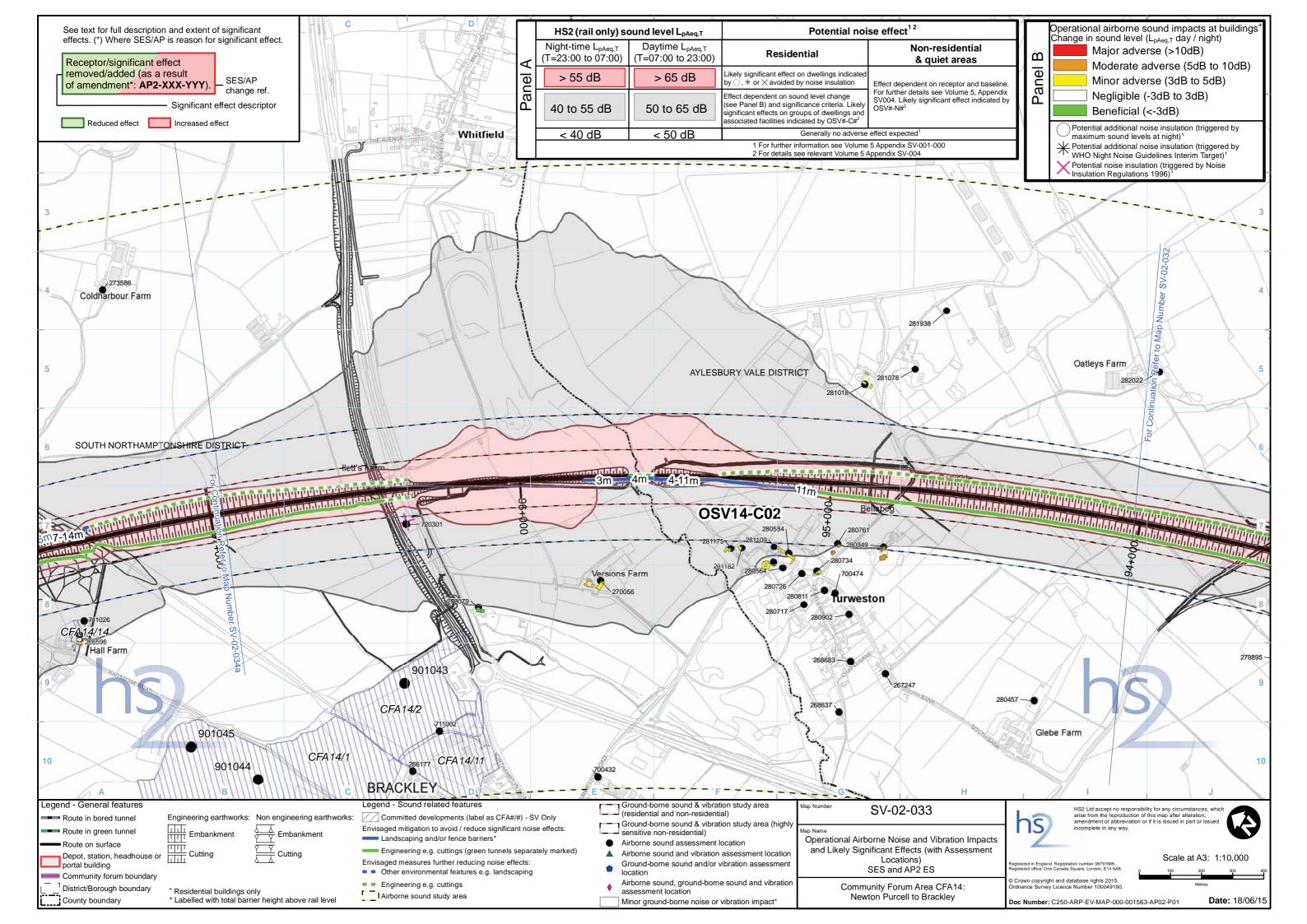
SV-02 – Operational Airborne Noise and Vibration Impacts and Likely Significant Effects (with Assessment Locations)

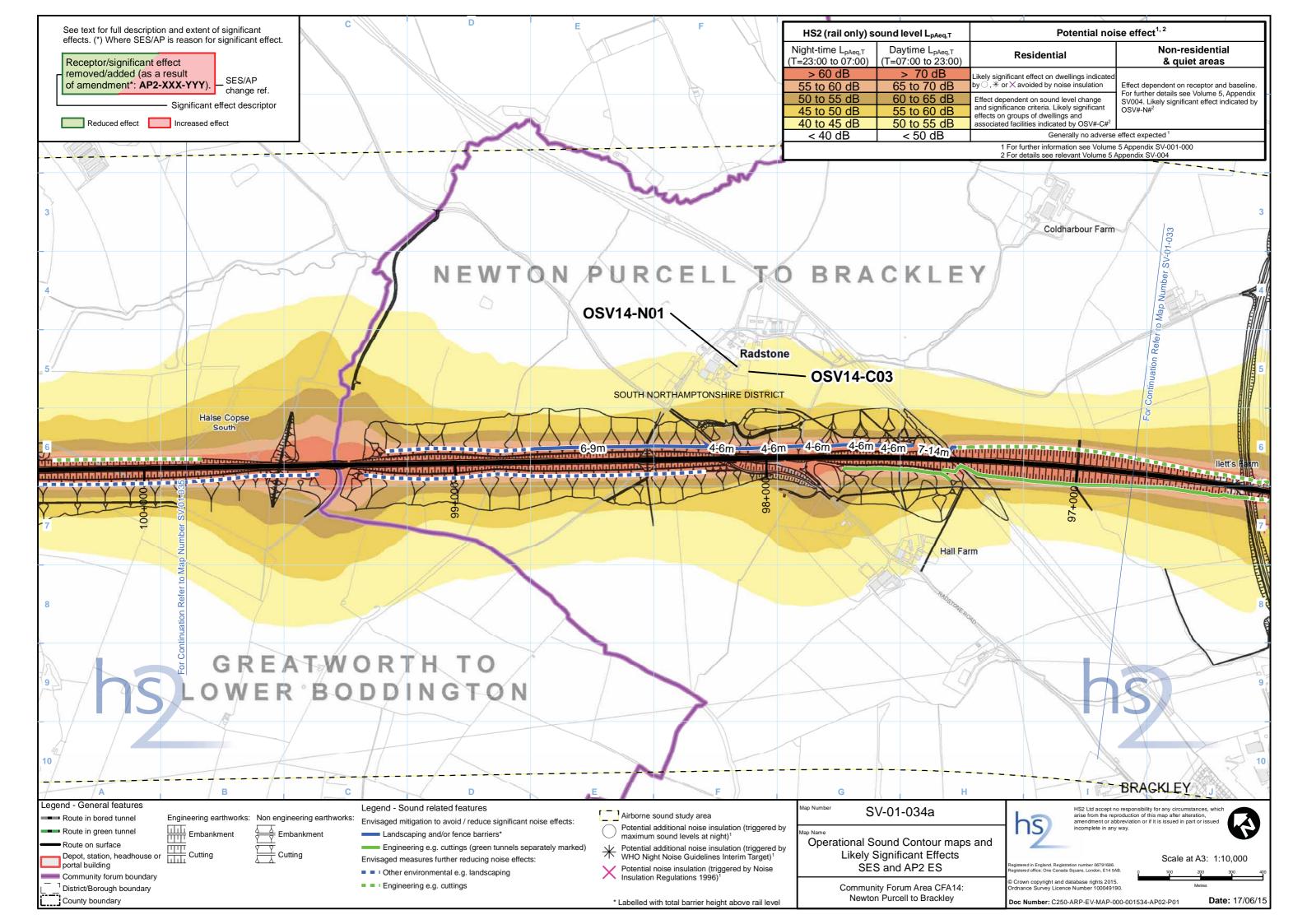
SV-04 – Assessment and Monitoring Locations for Operational Sound, Noise& Vibration Assessments

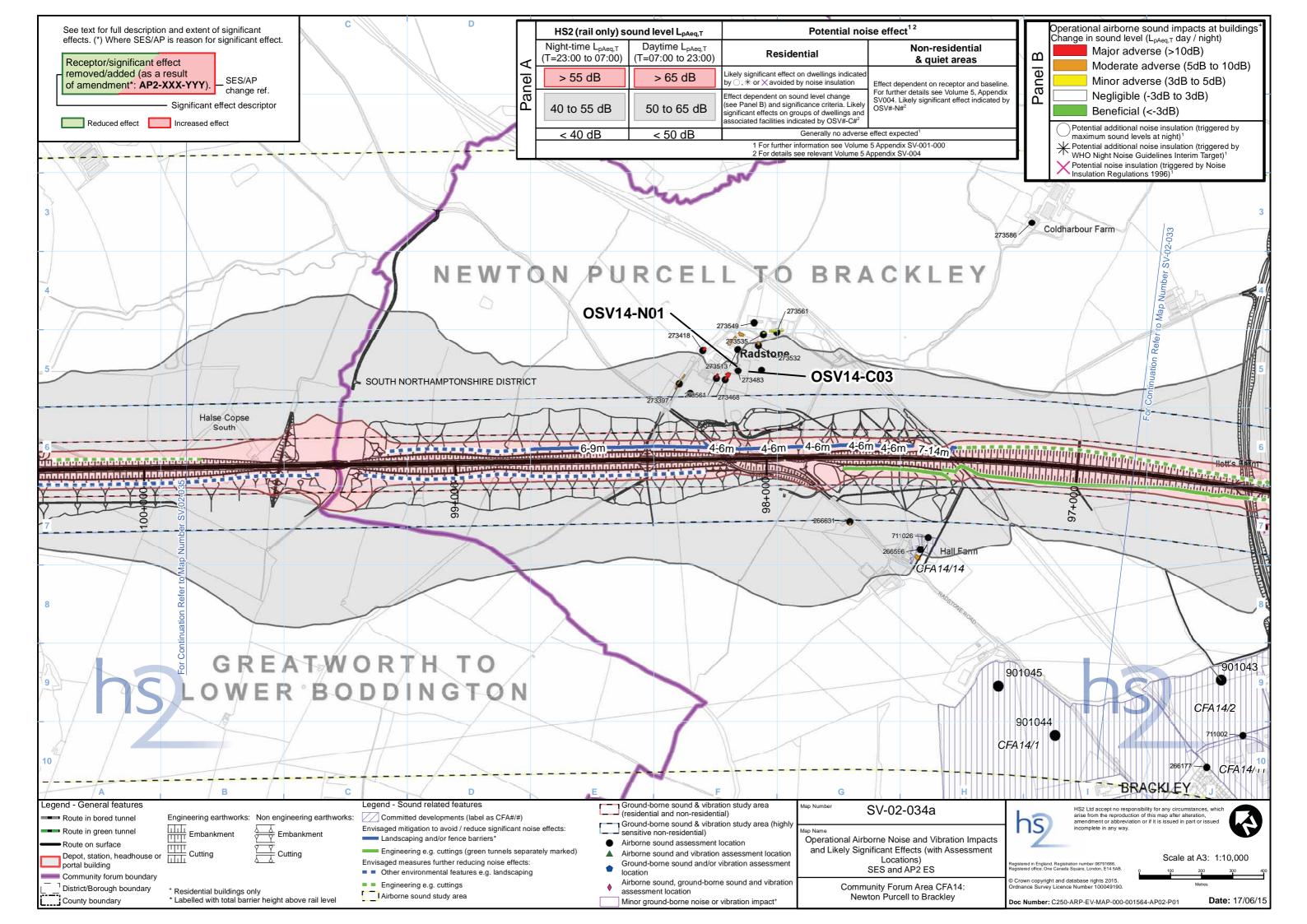


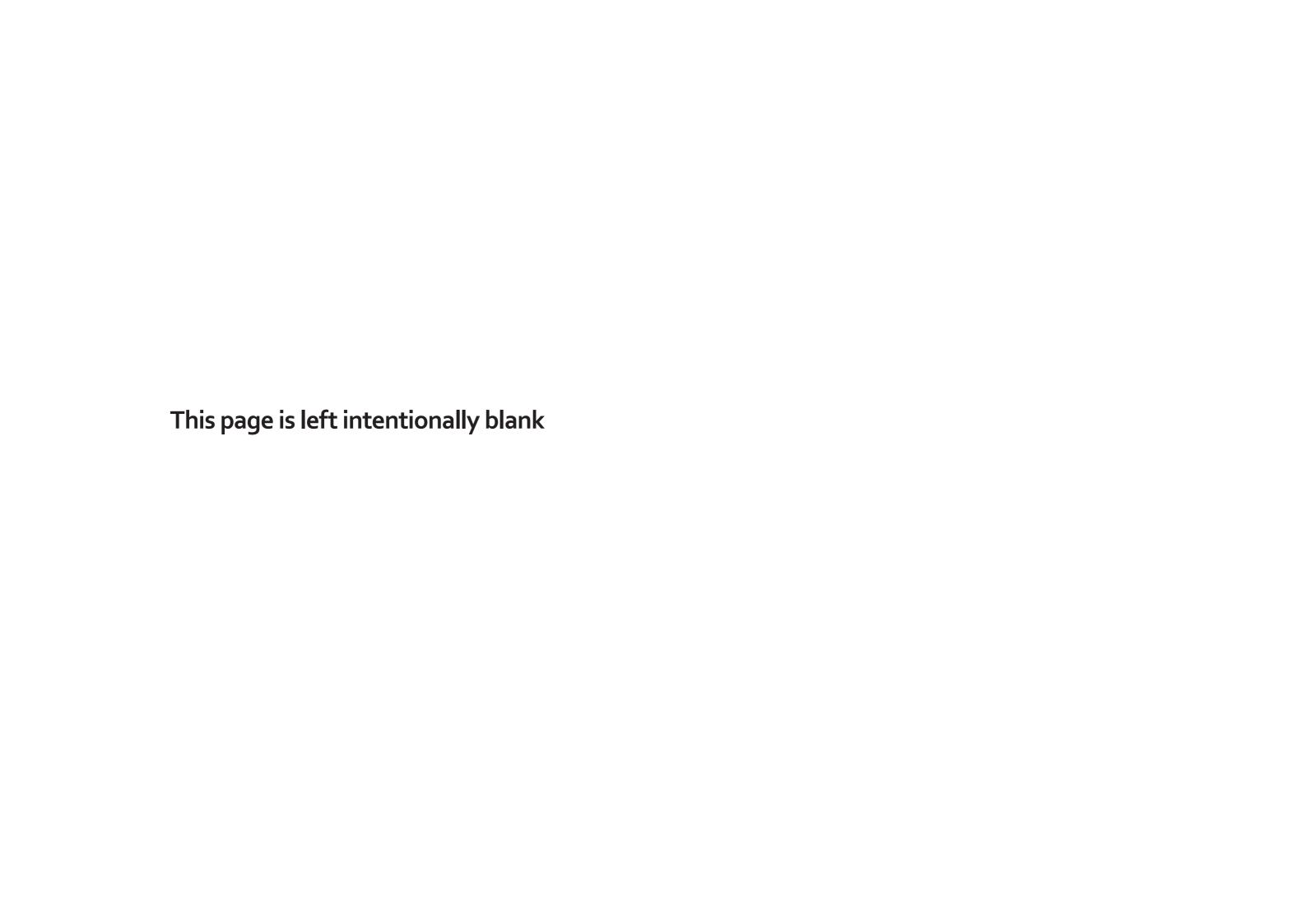


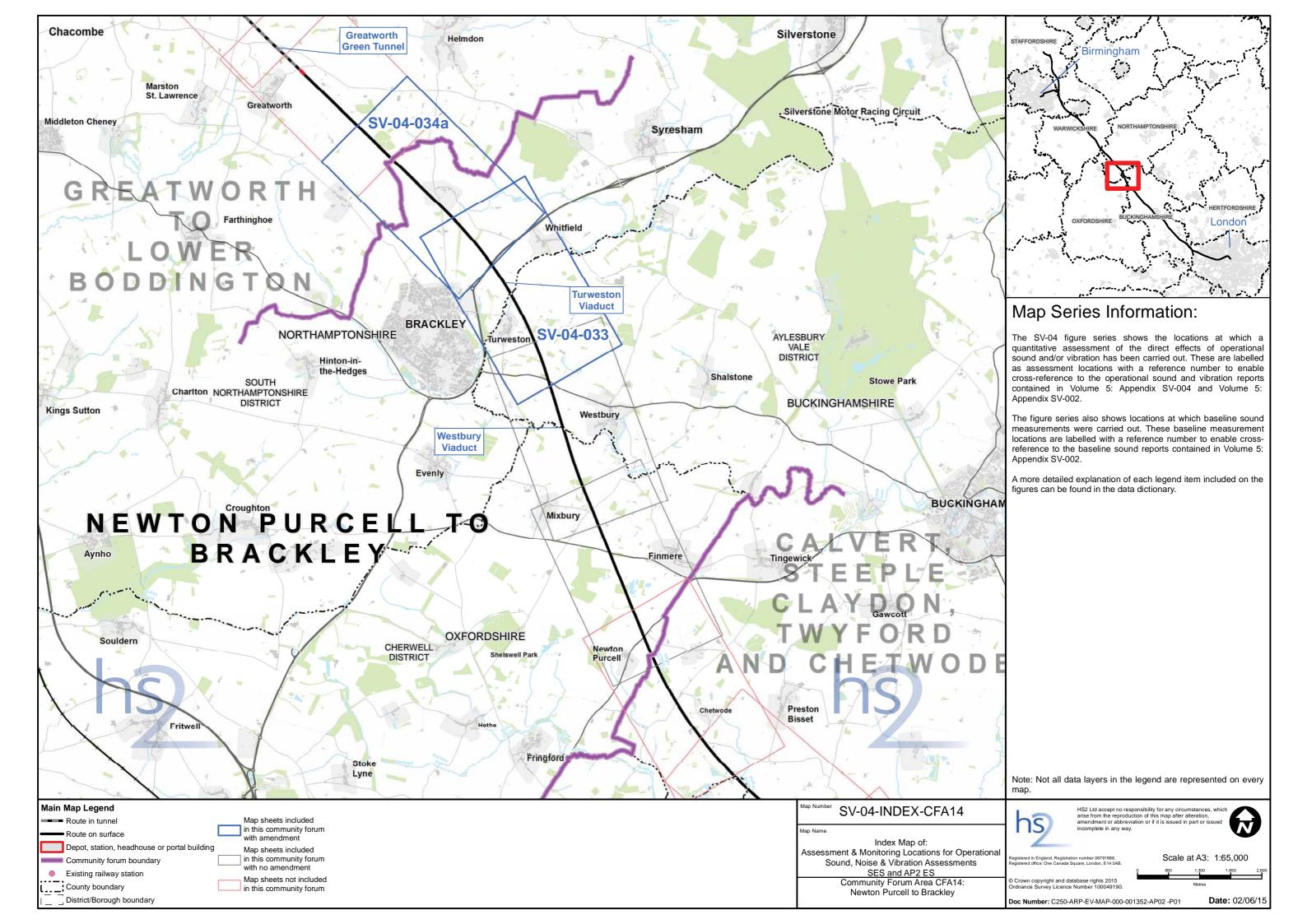


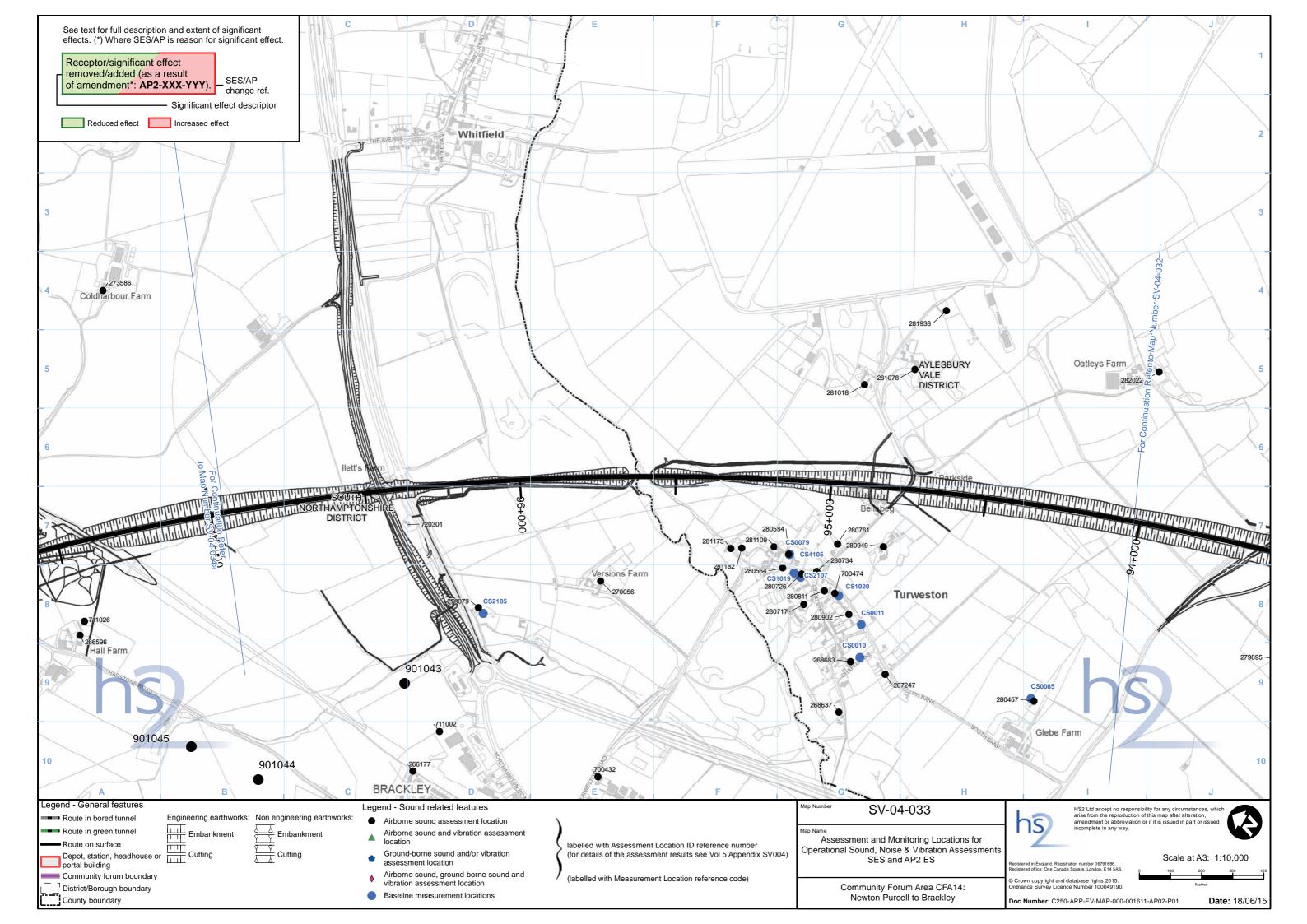


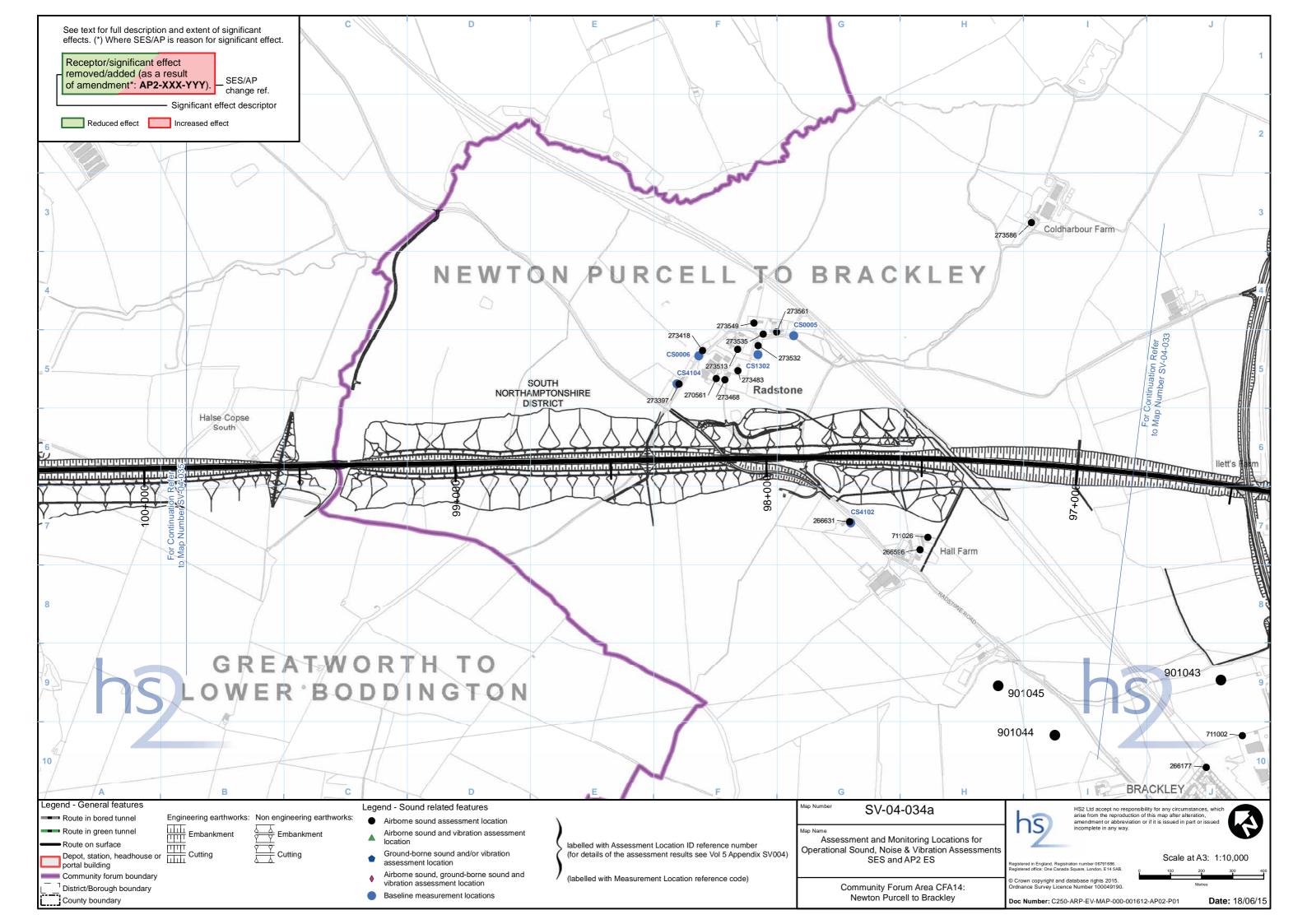


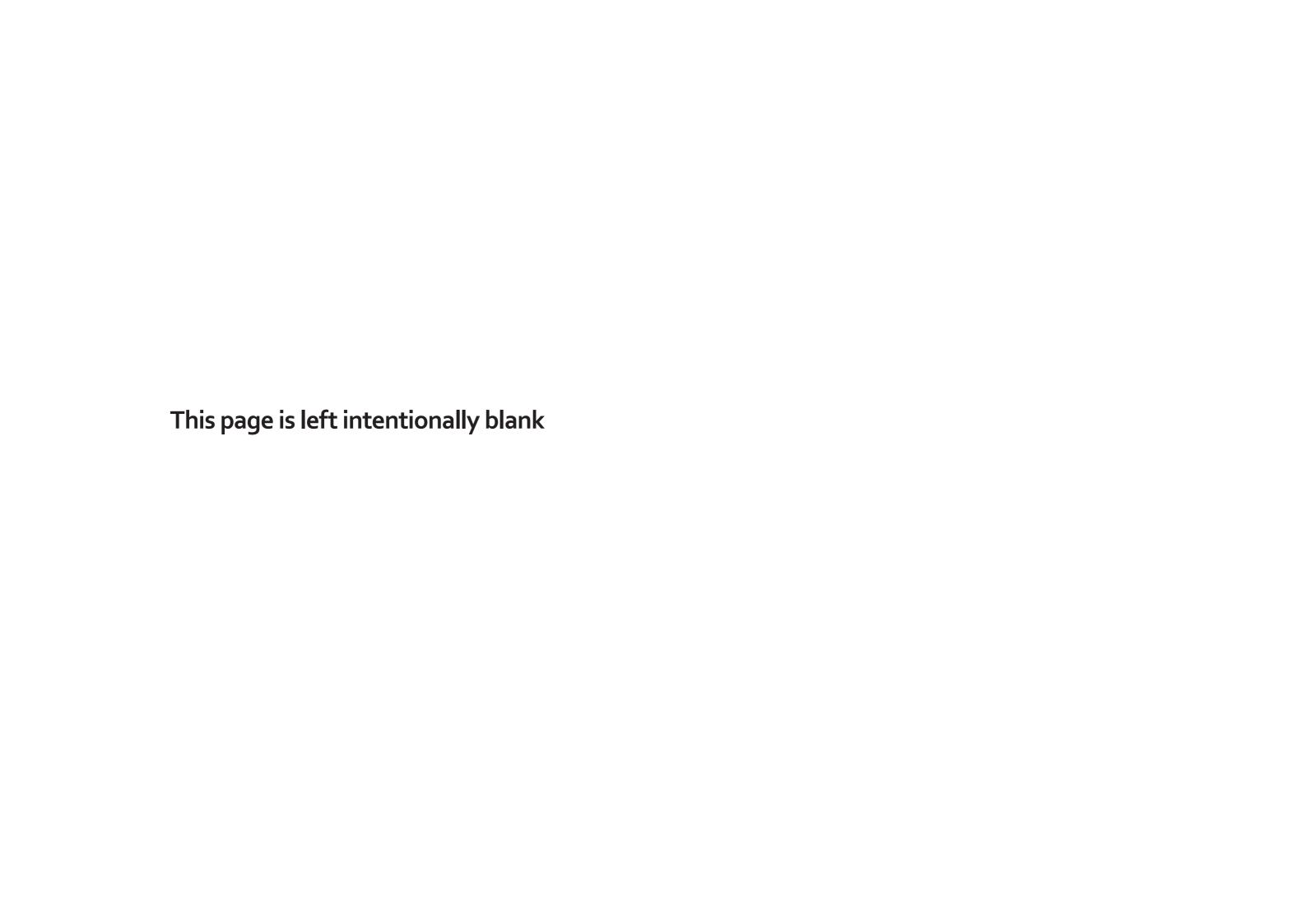












## HIGH SPEED RAIL (LONDON - WEST MIDLANDS)

Supplementary Environmental Statement and Additional Provision 2 Environmental Statement

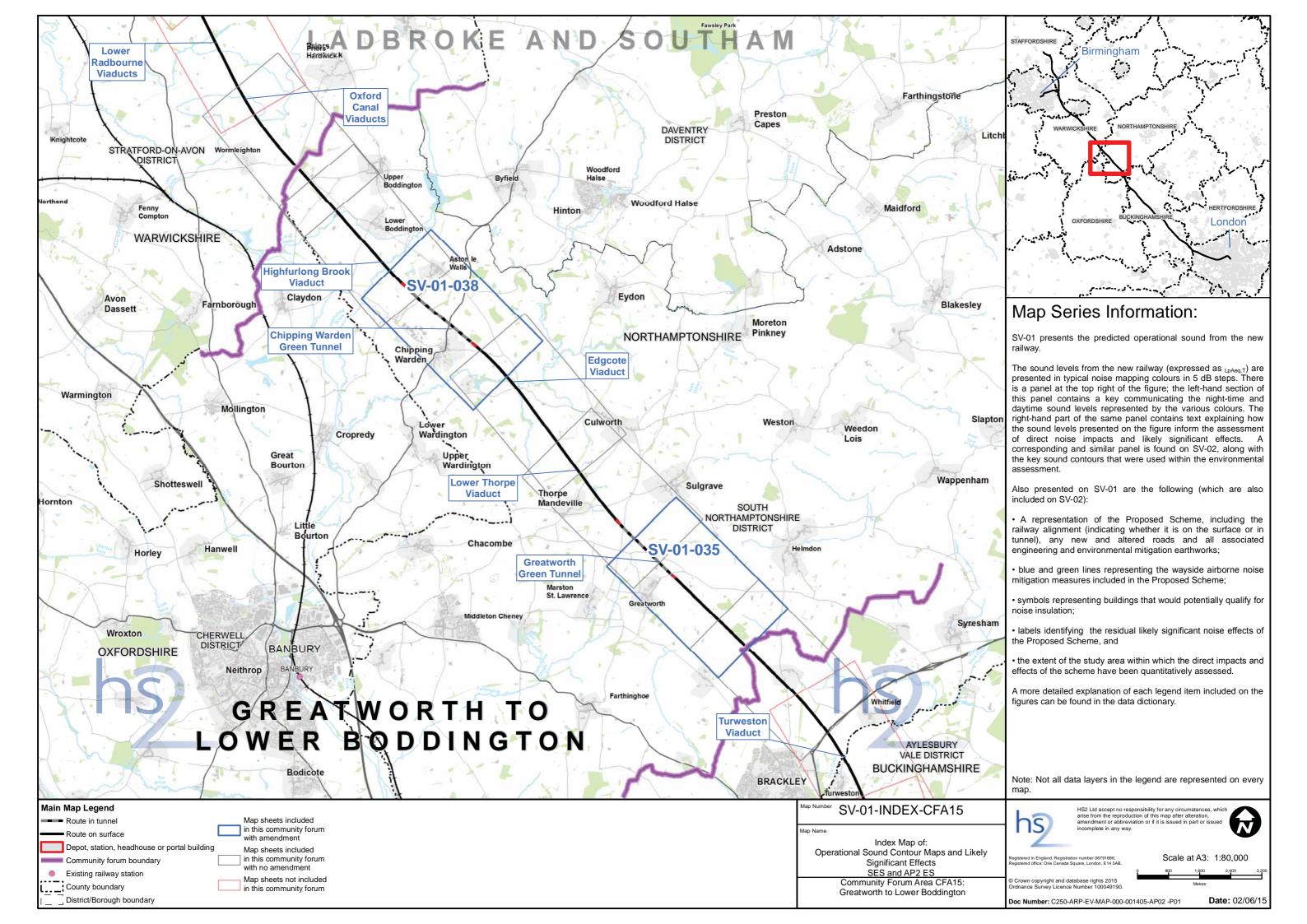
Volume 5 | CFA15 | Greatworth to Lower Boddington

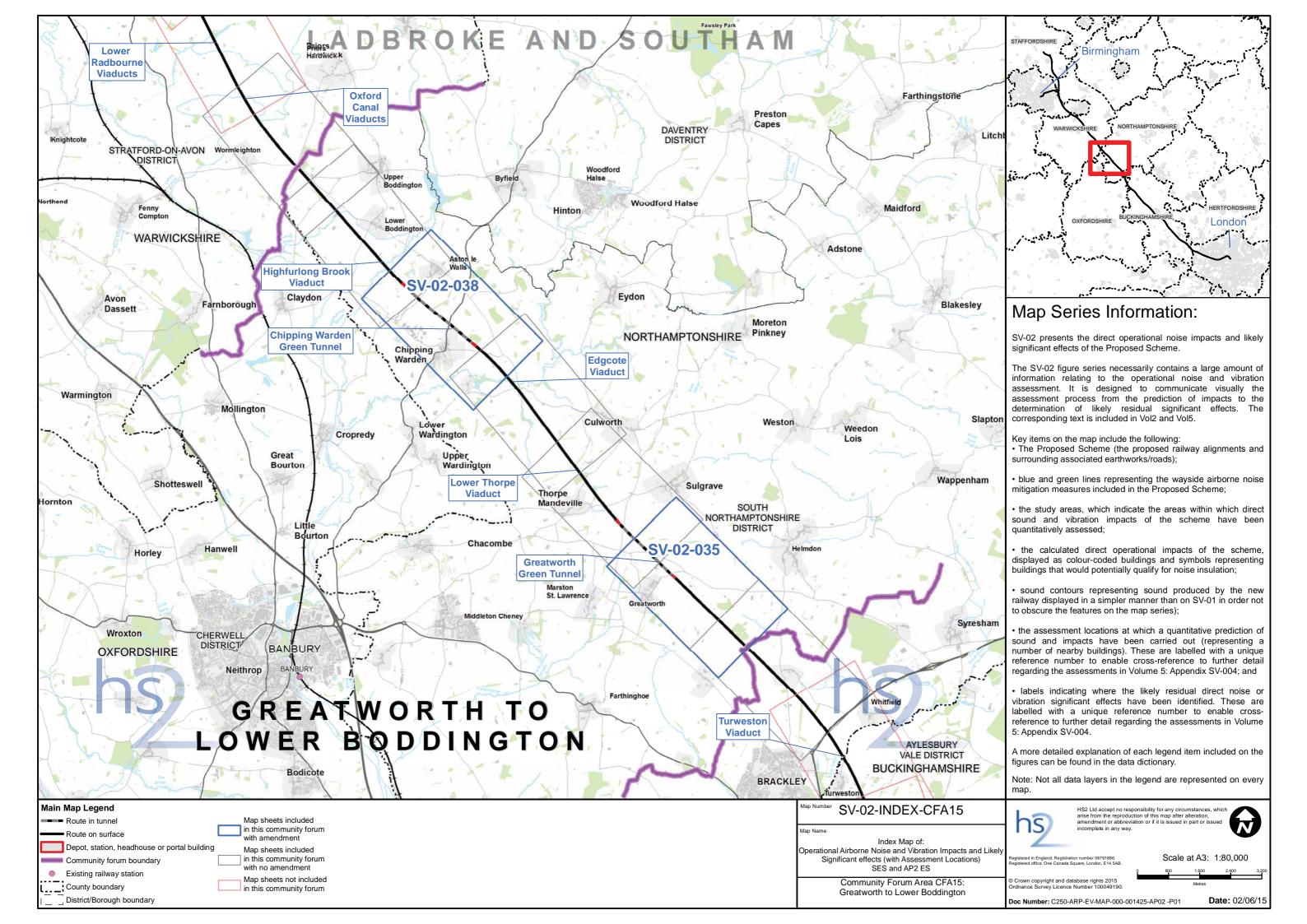
SV-01 – Operational Sound Contour Maps and Likely Significant Effects

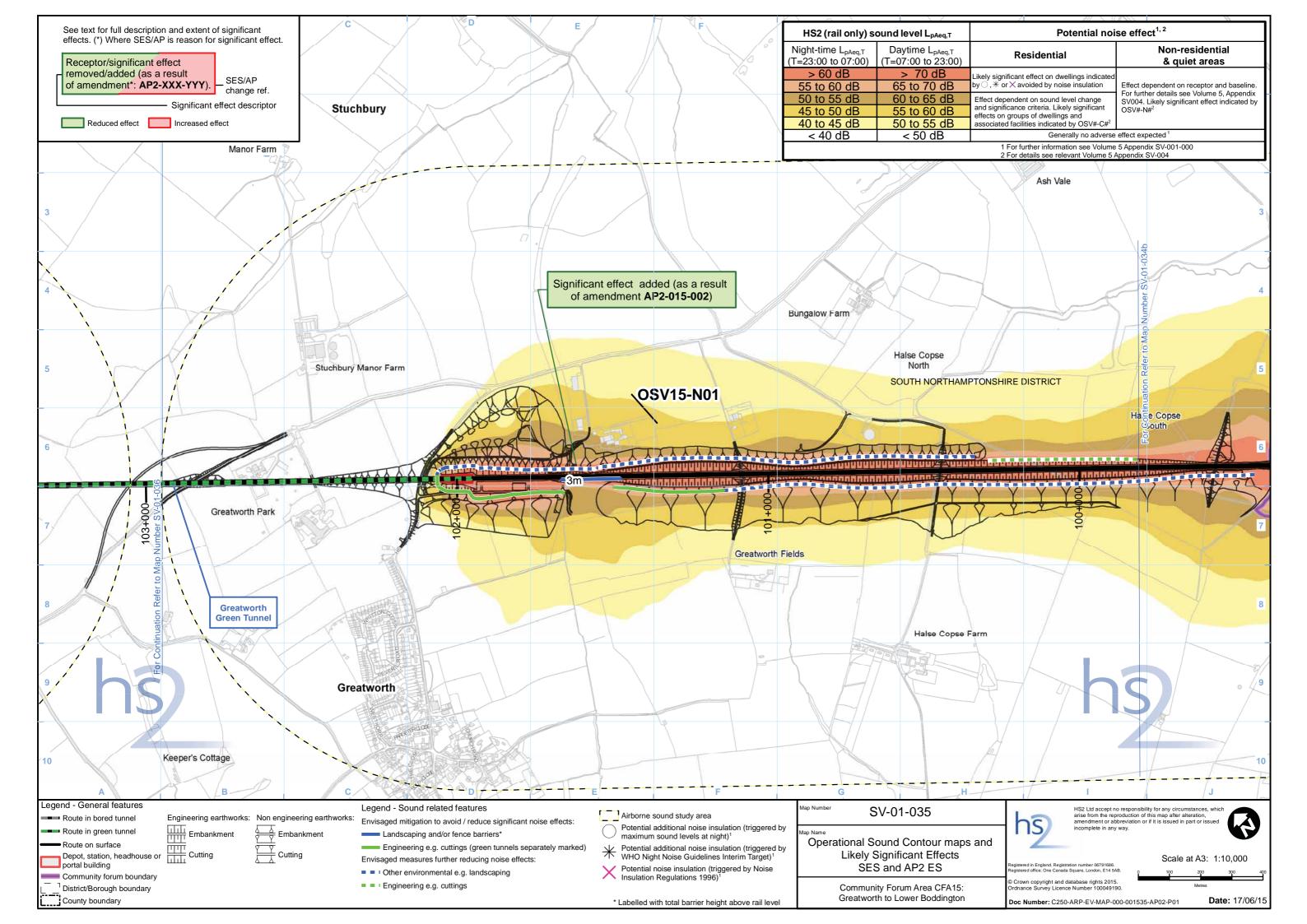
SV-02 – Operational Airborne Noise and Vibration Impacts and Likely Significant Effects (with Assessment Locations)

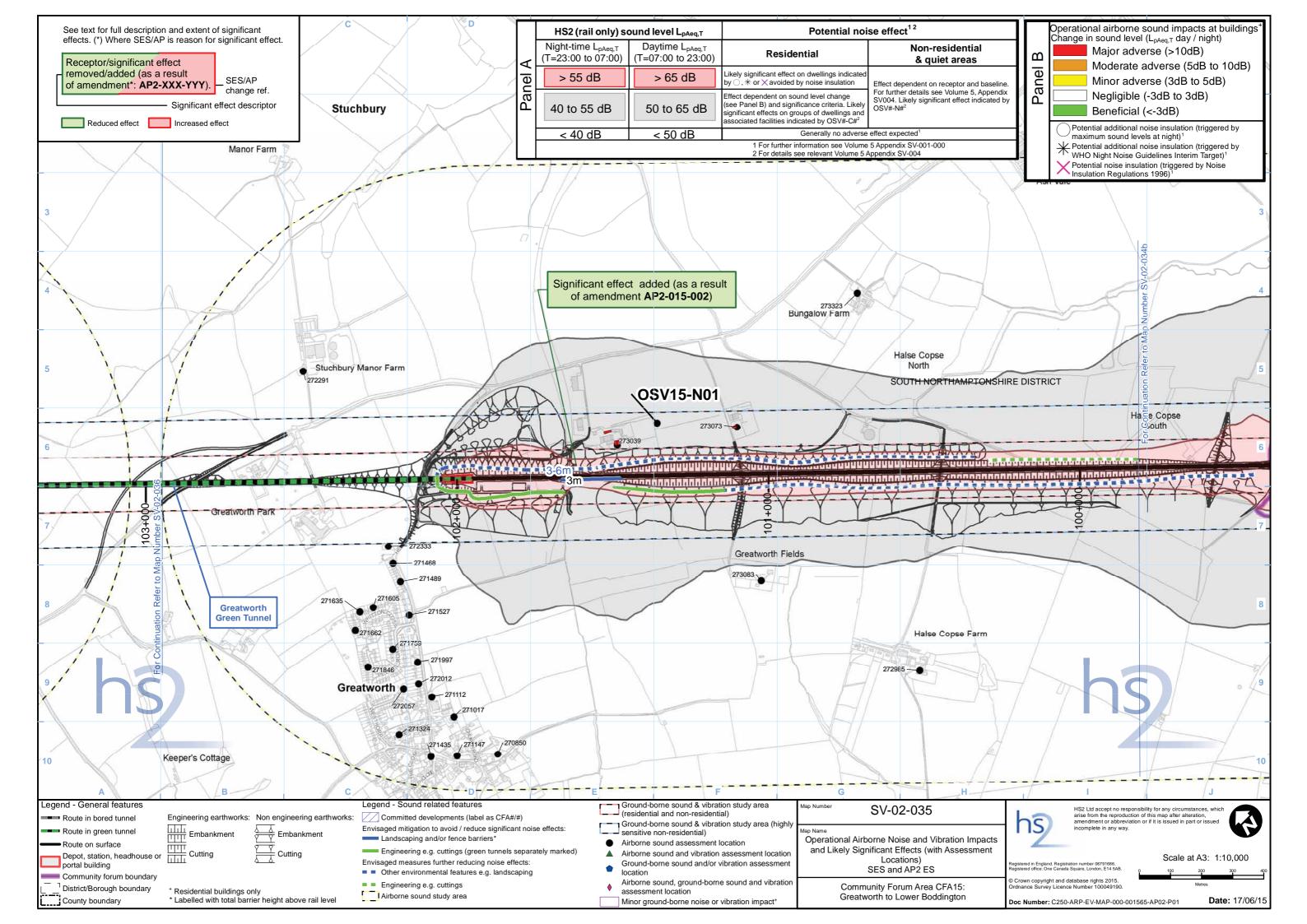
SV-03 – Assessment and Monitoring Locations for Construction Sound, Noise & Vibration Assessments

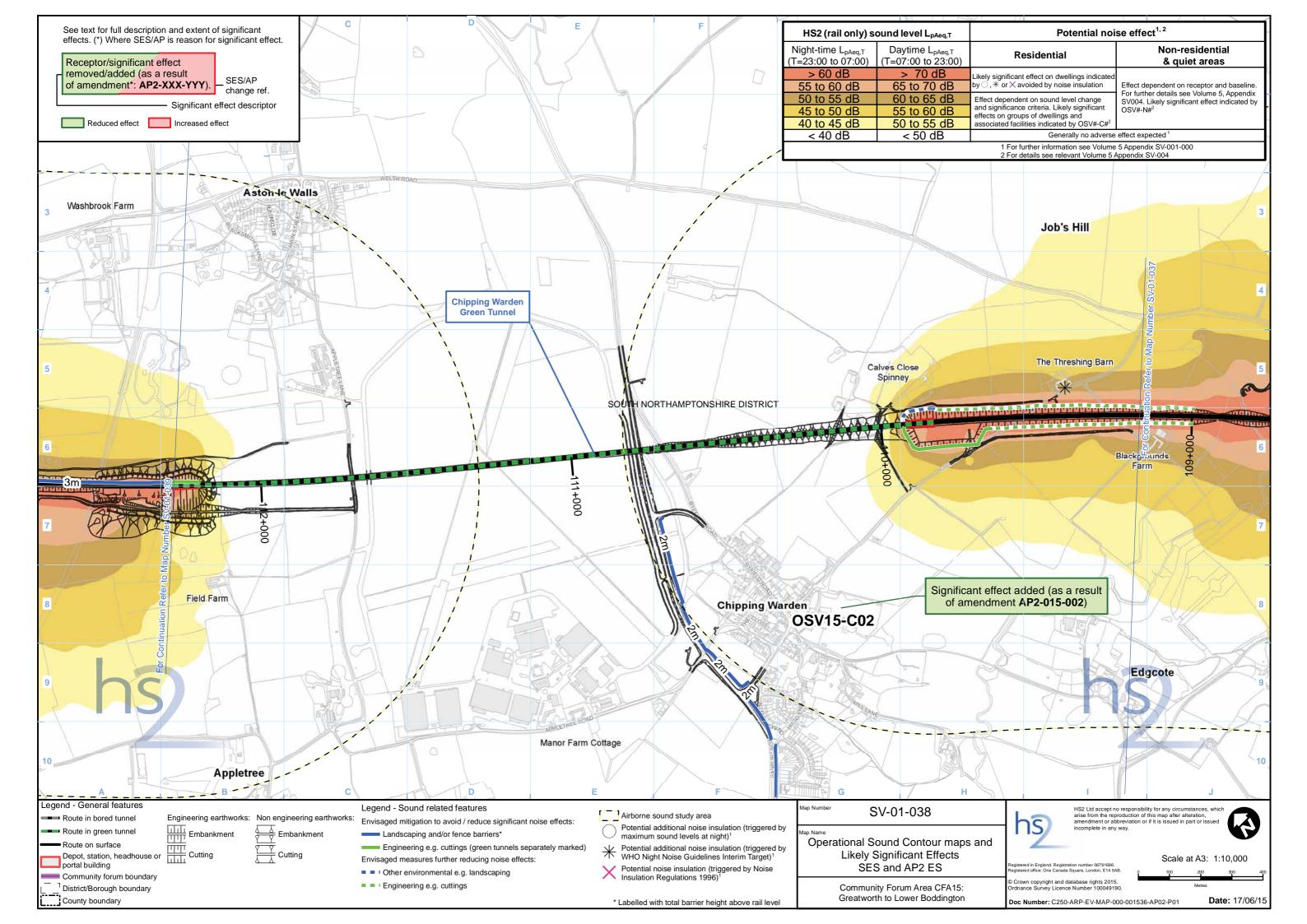
SV-04 – Assessment and Monitoring Locations for Operational Sound, Noise & Vibration Assessments

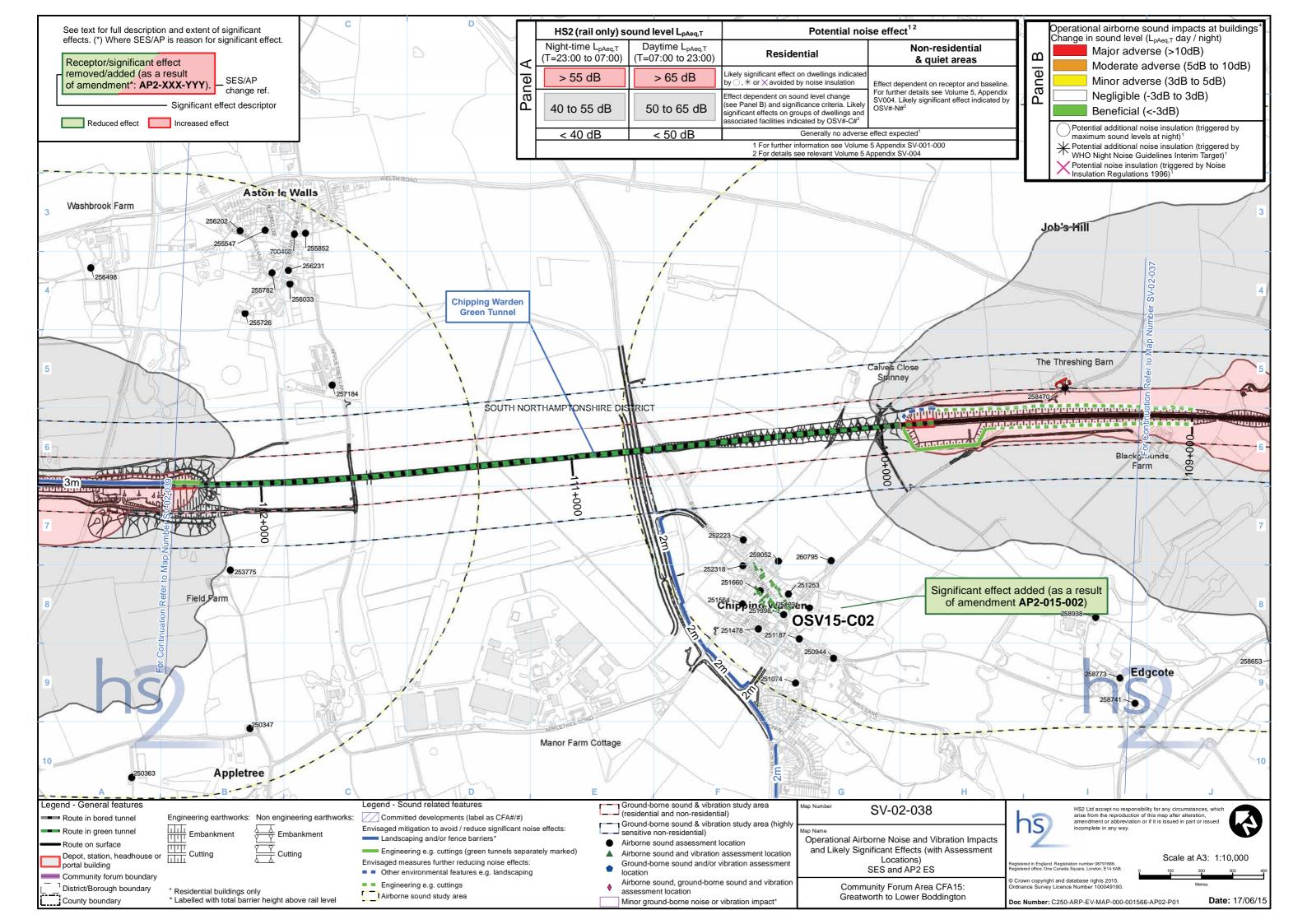


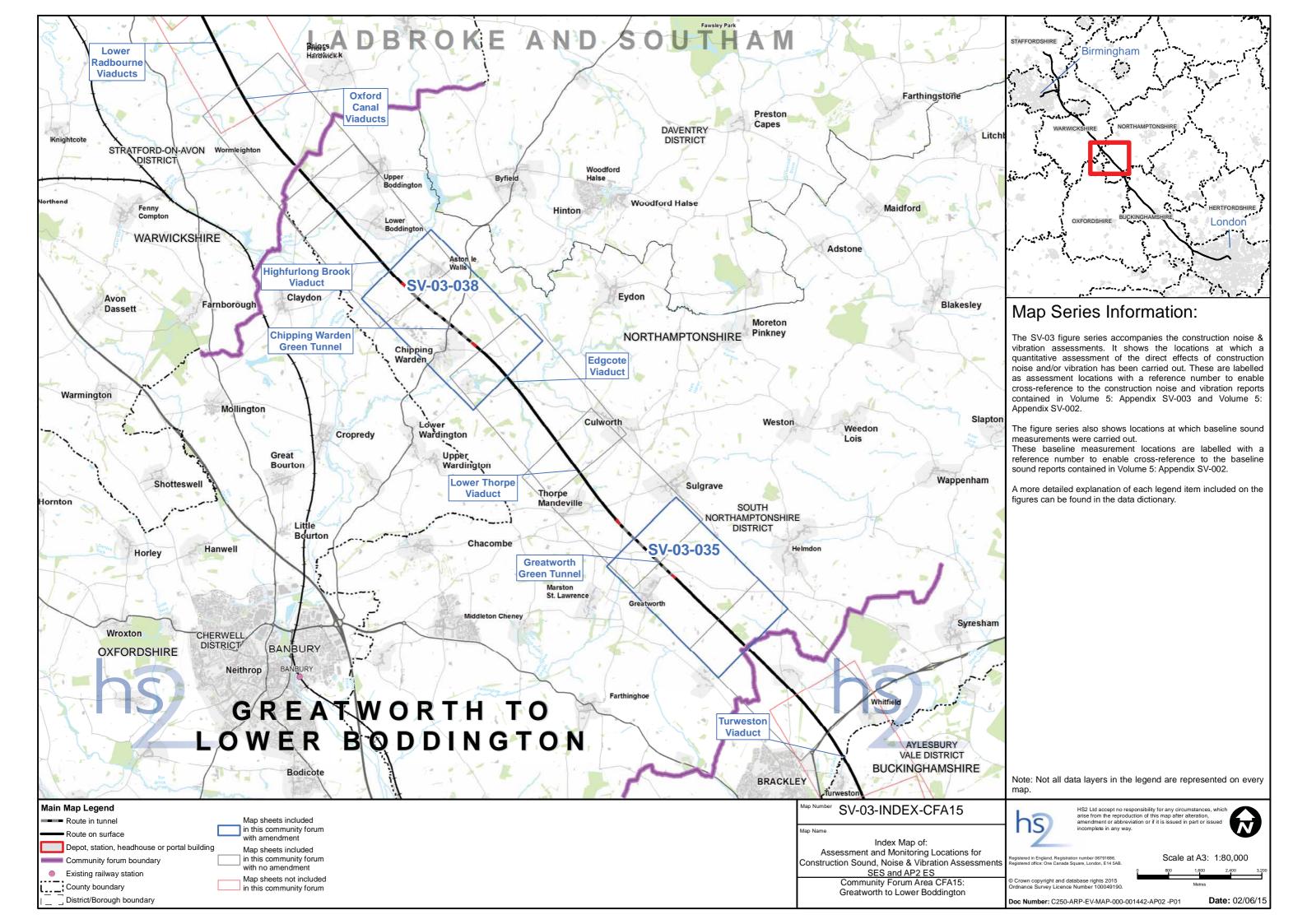


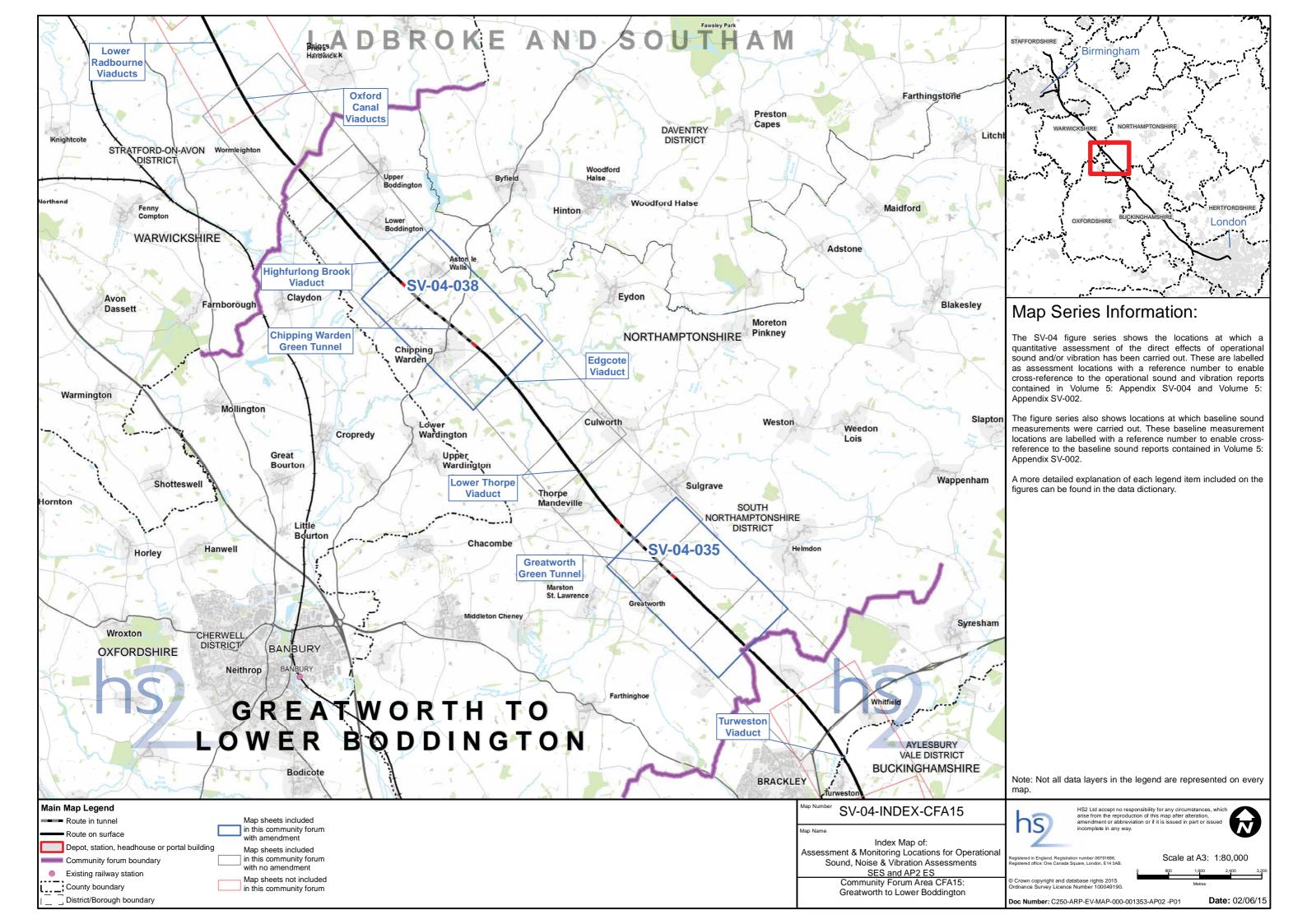


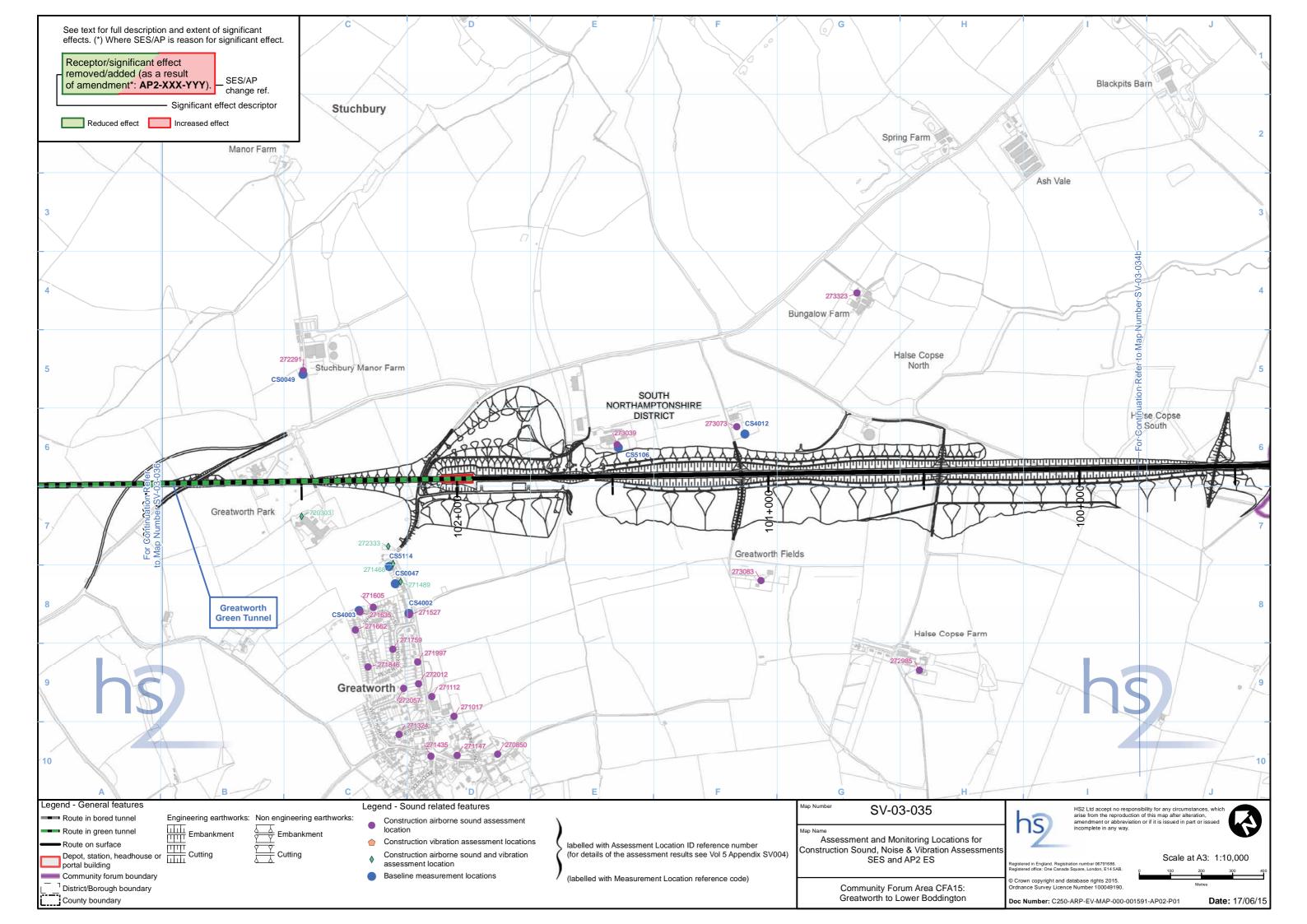


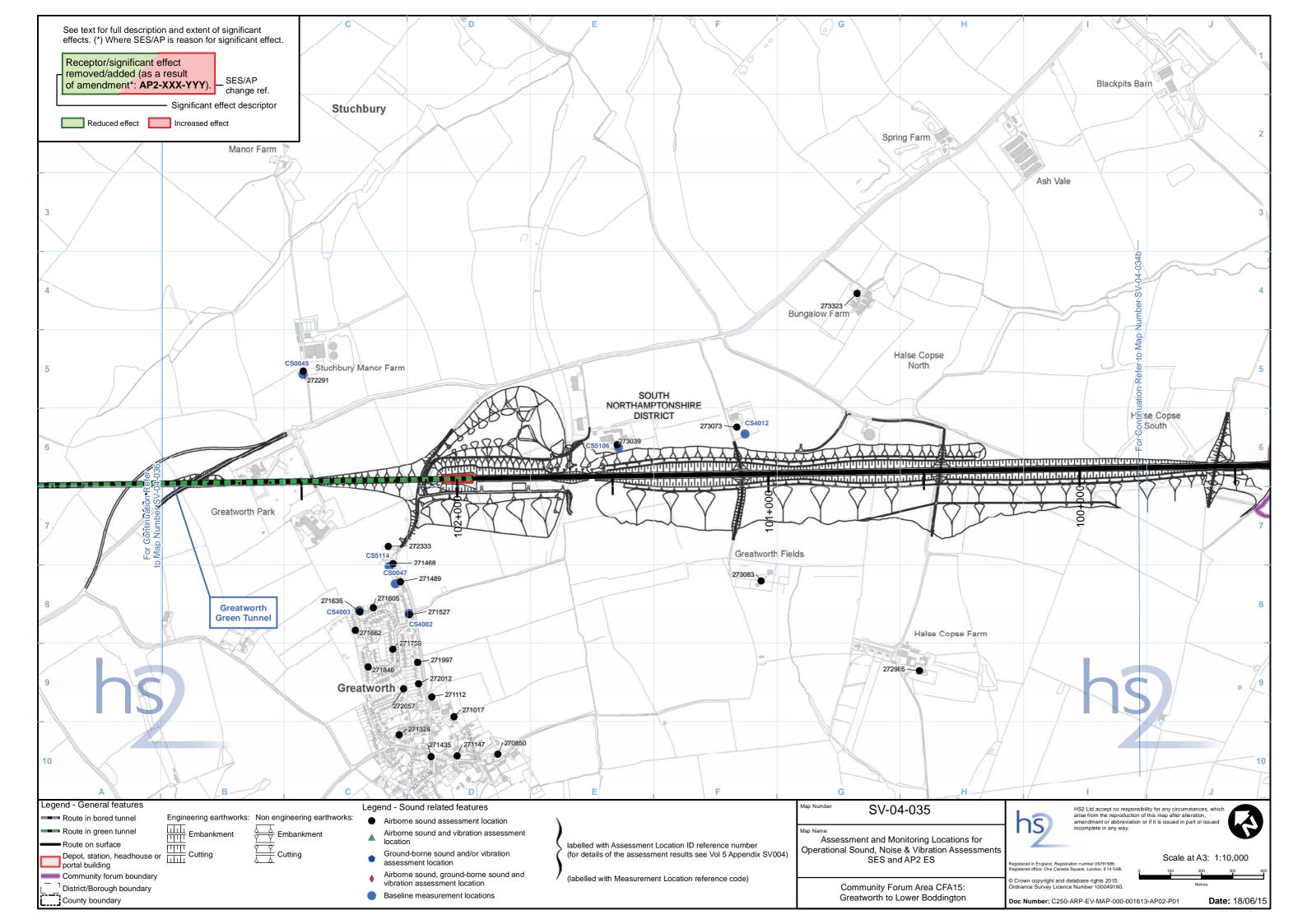


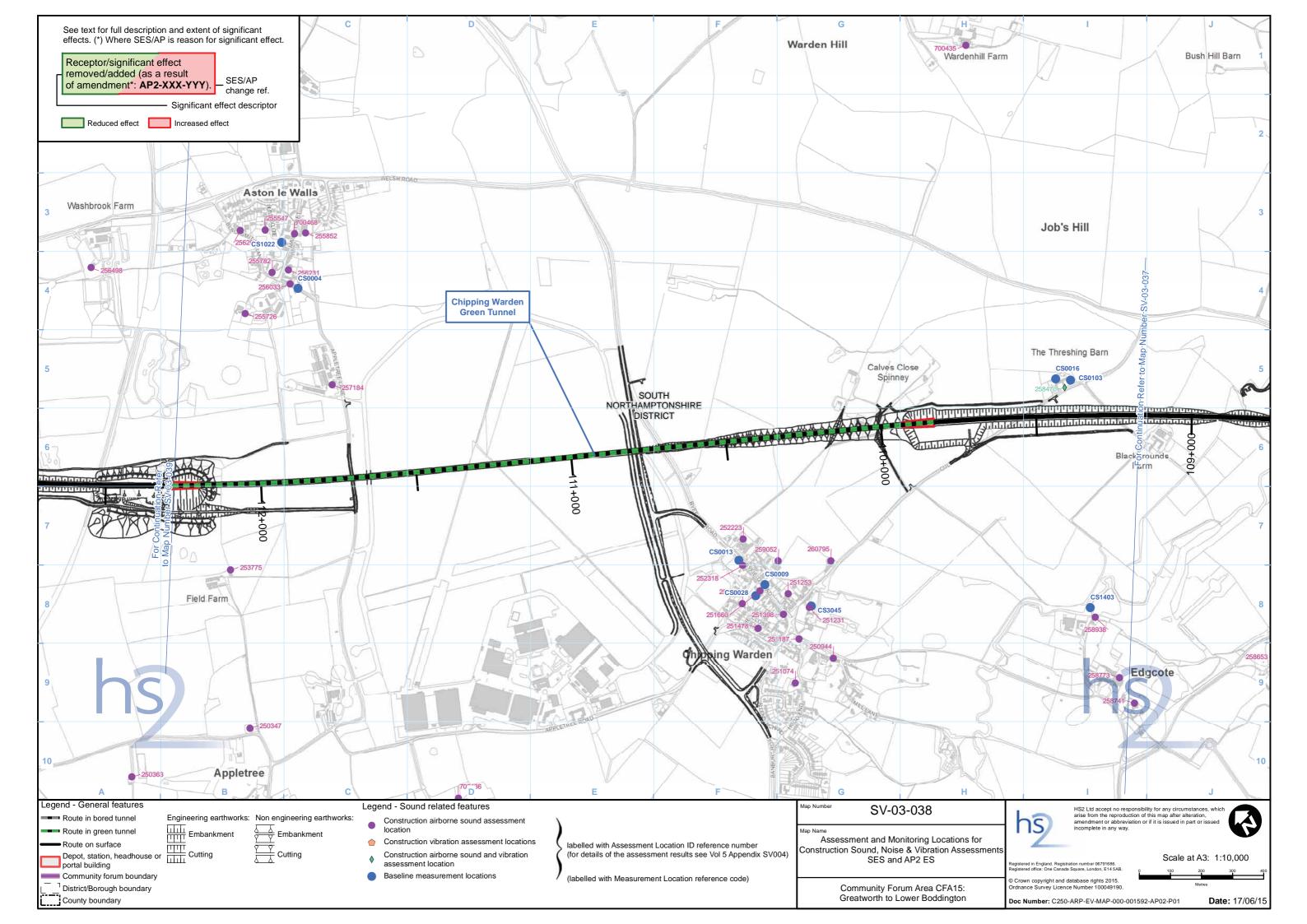


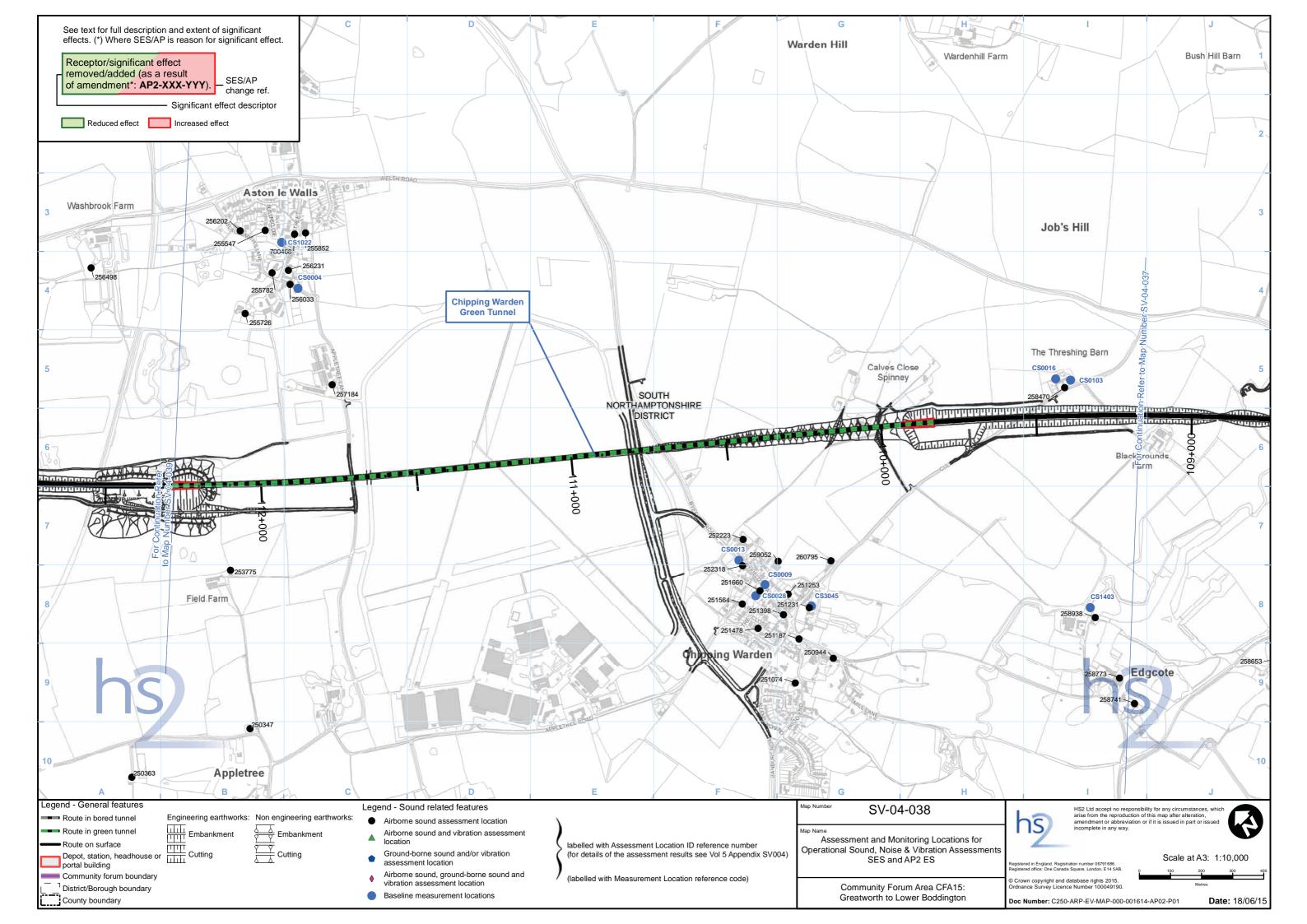


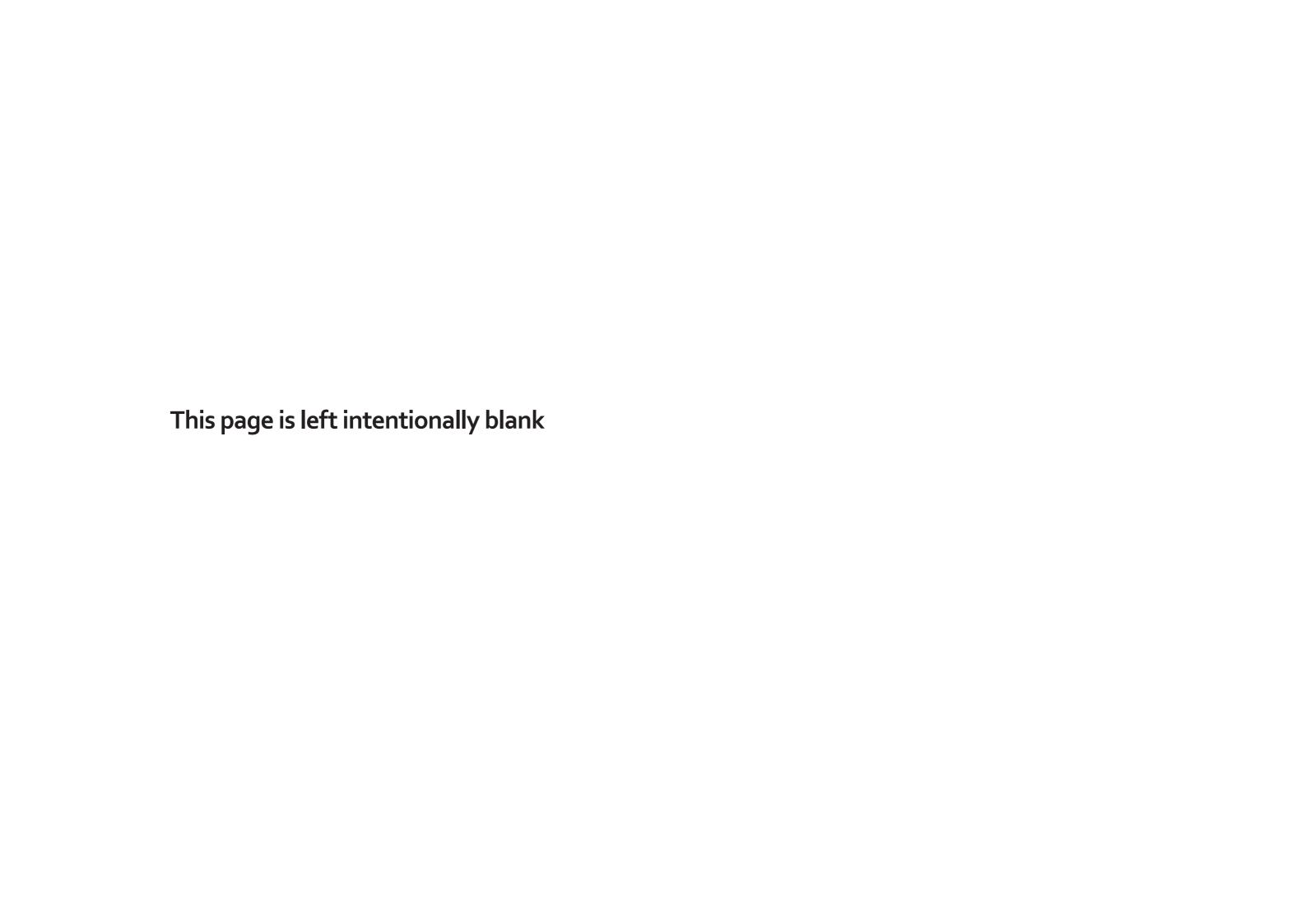












## HIGH SPEED RAIL (LONDON - WEST MIDLANDS)

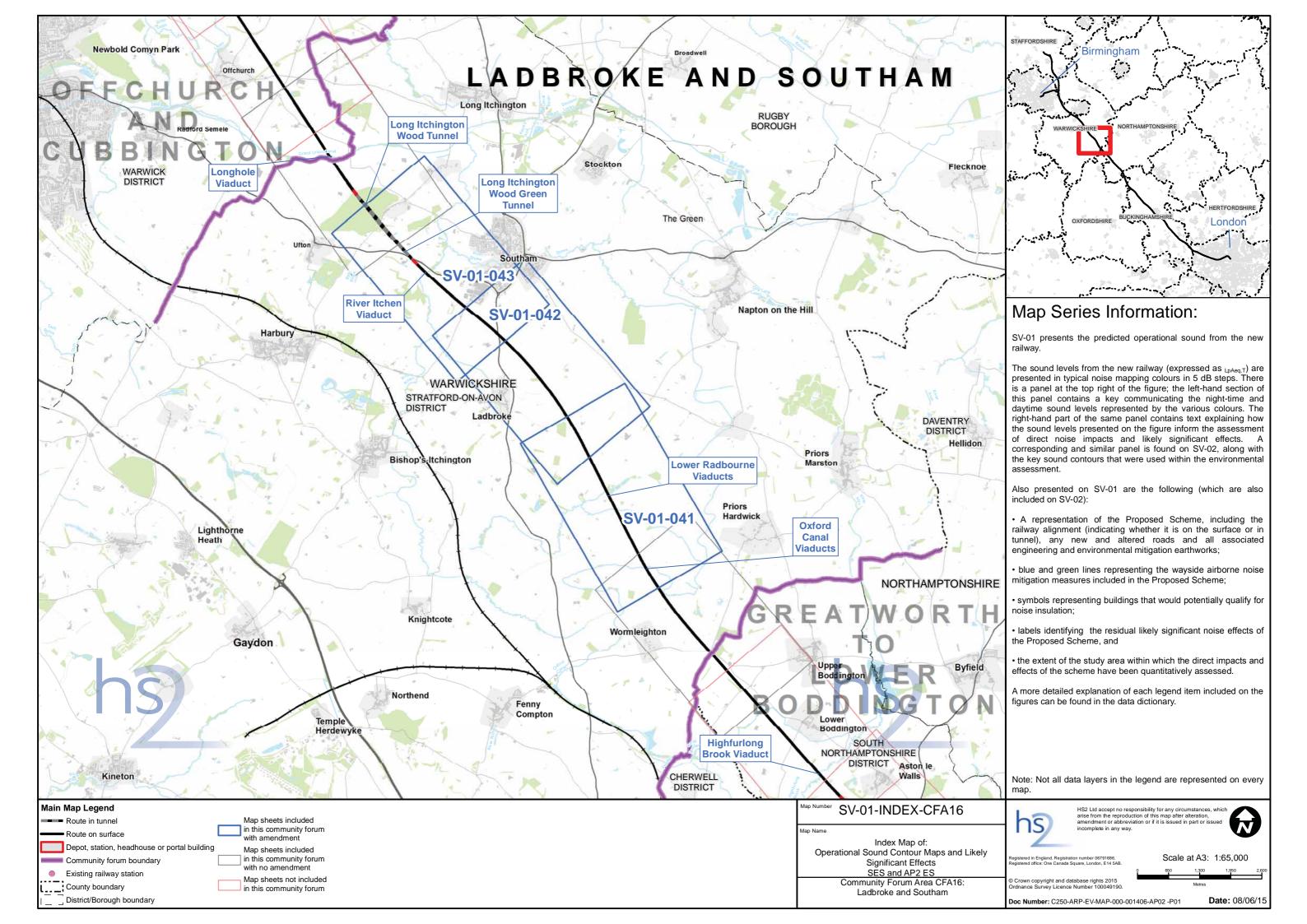
Supplementary Environmental Statement and Additional Provision 2 Environmental Statement

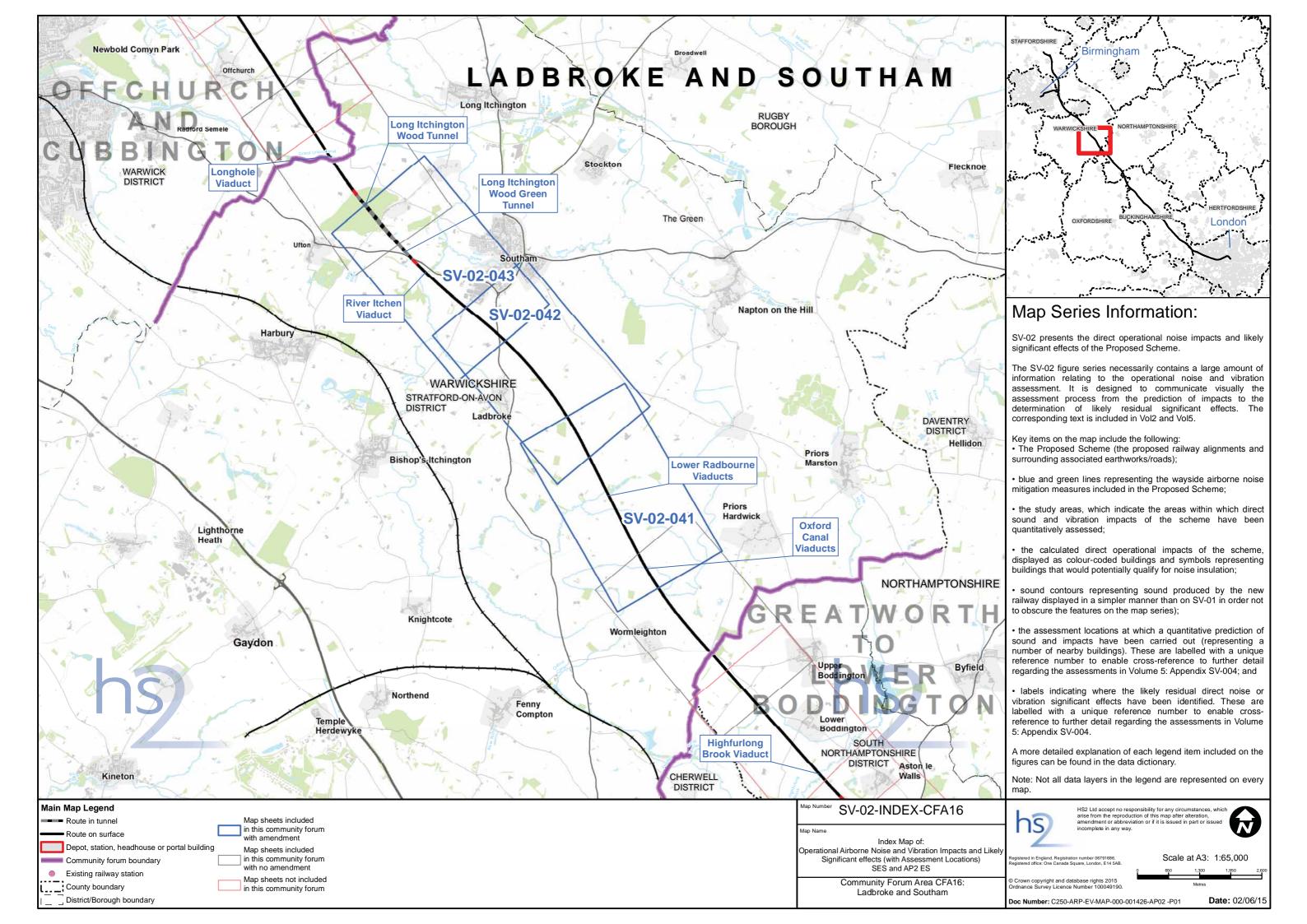
Volume 5 | CFA16 | Ladbroke and Southam

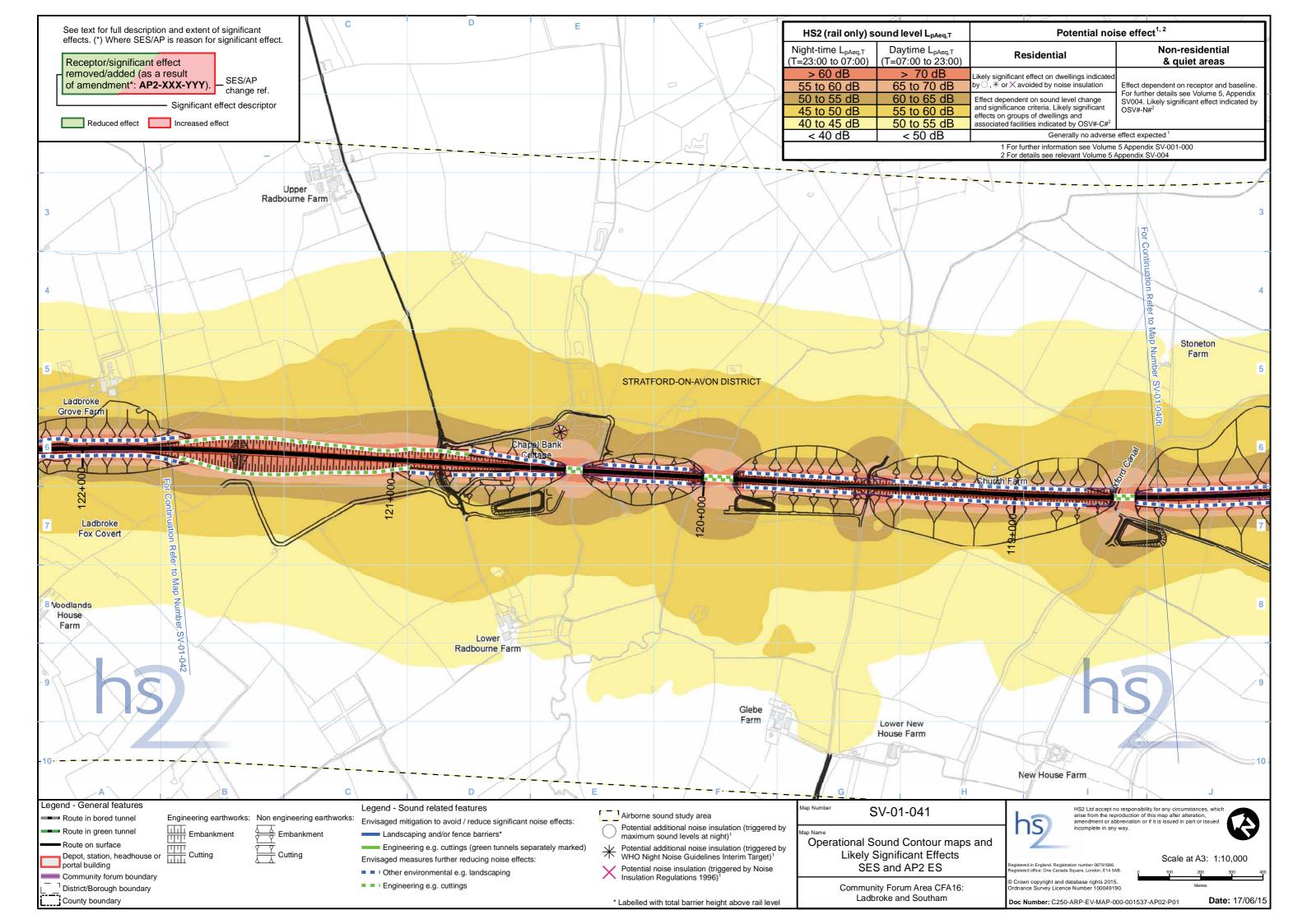
SV-01 – Operational Sound Contour Maps and Likely Significant Effects

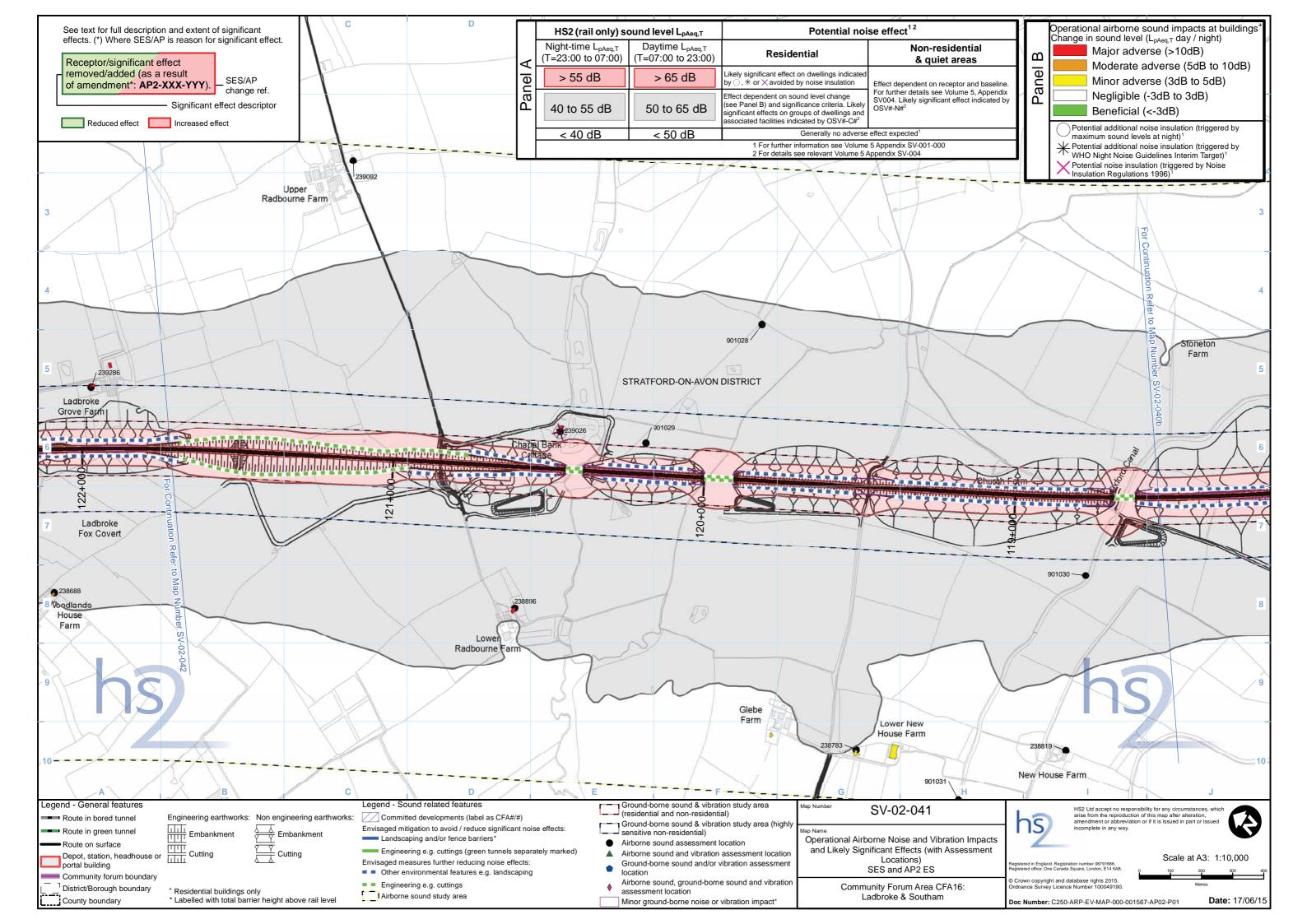
SV-02 – Operational Airborne Noise and Vibration Impacts and Likely Significant Effects (with Assessment Locations)

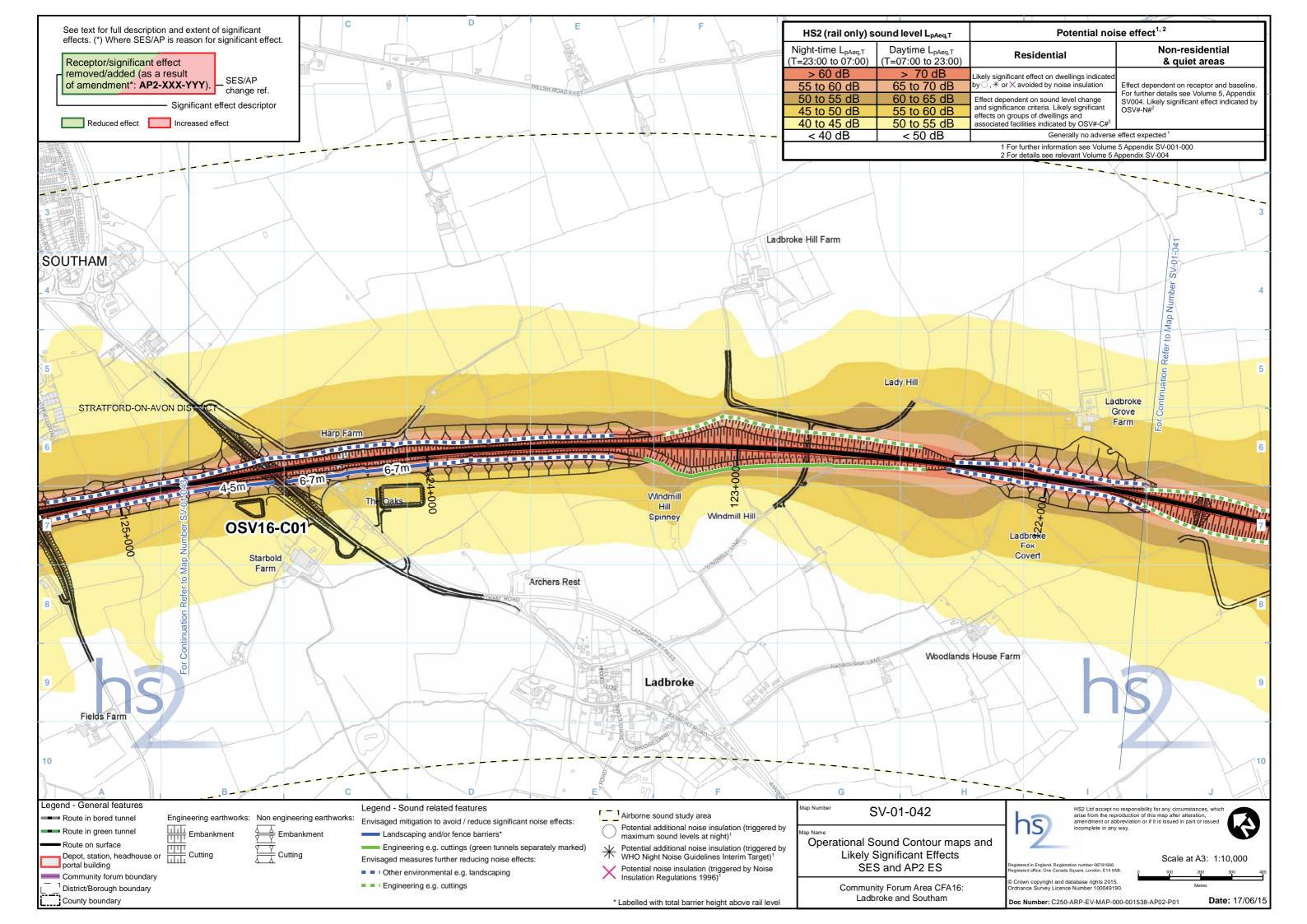
SV-03 – Assessment and Monitoring Locations for Construction Sound, Noise & Vibration Assessments

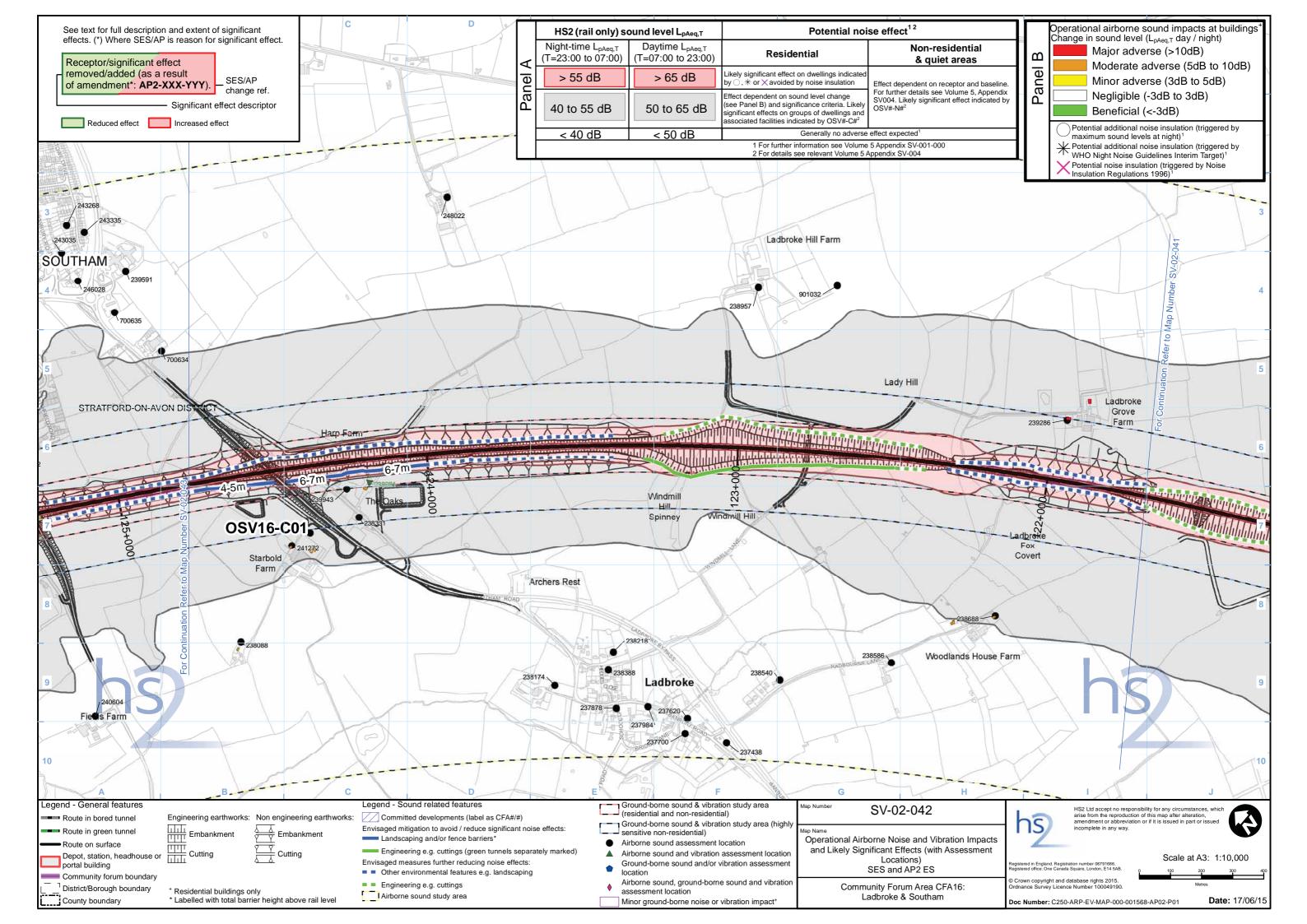


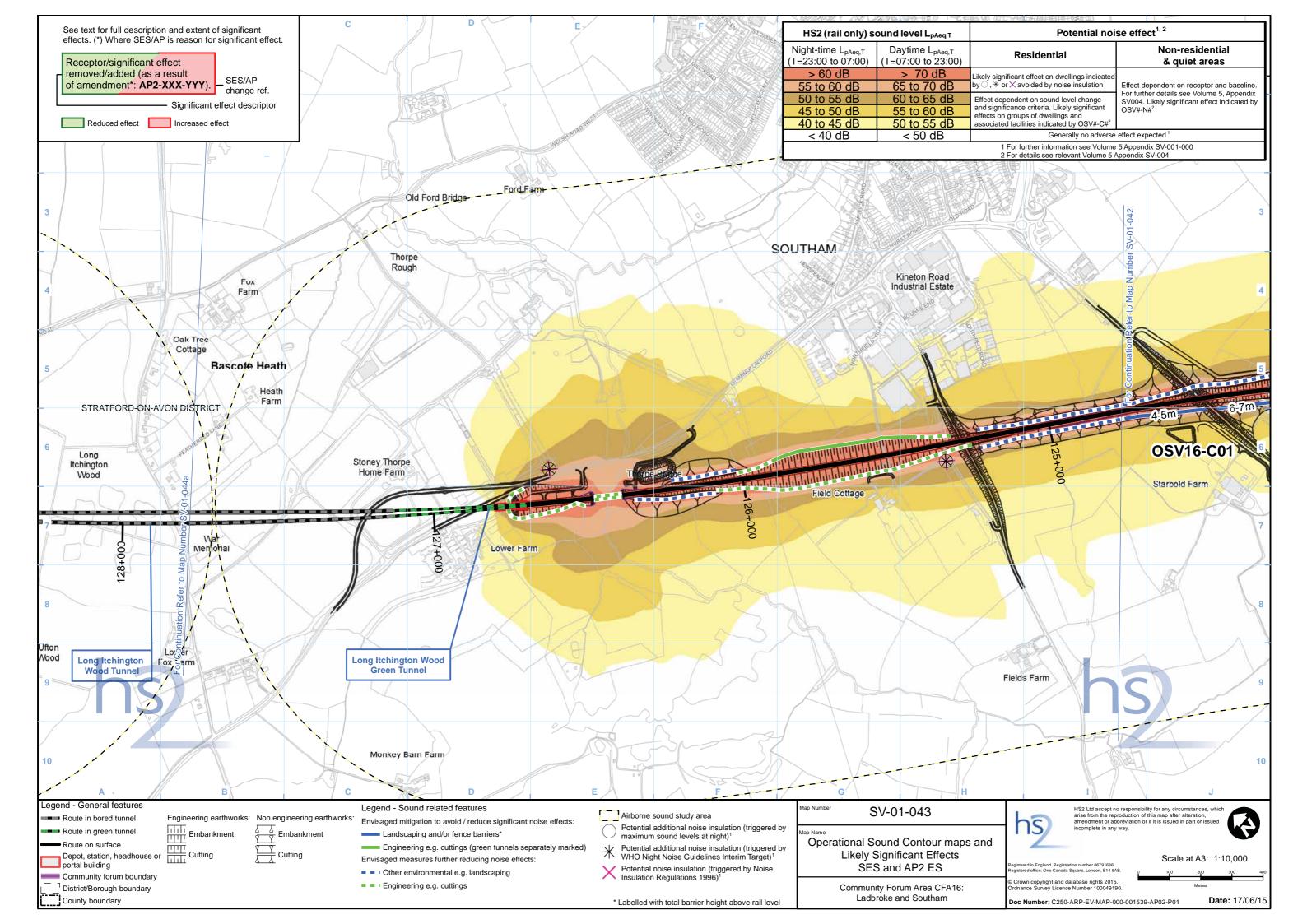


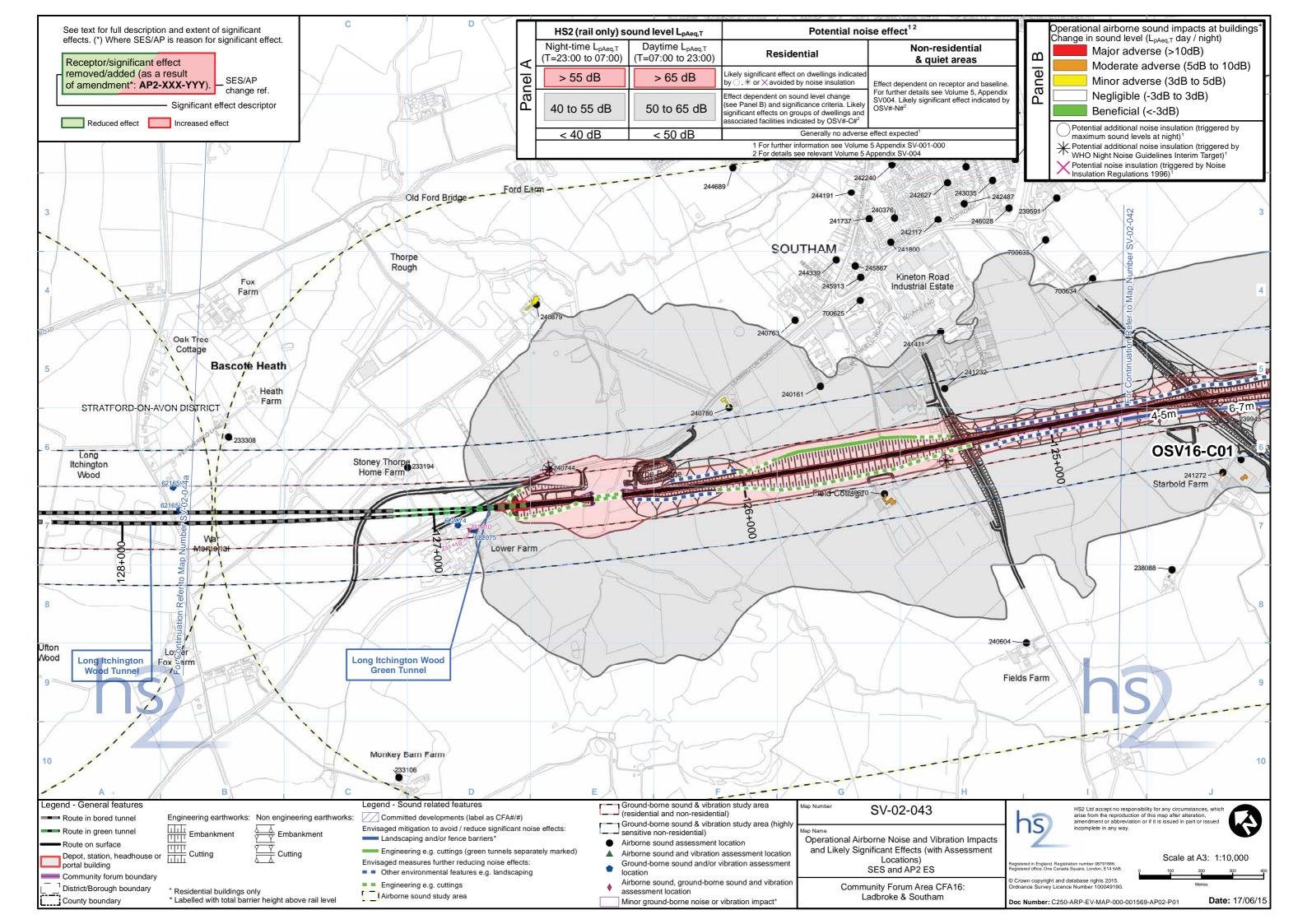


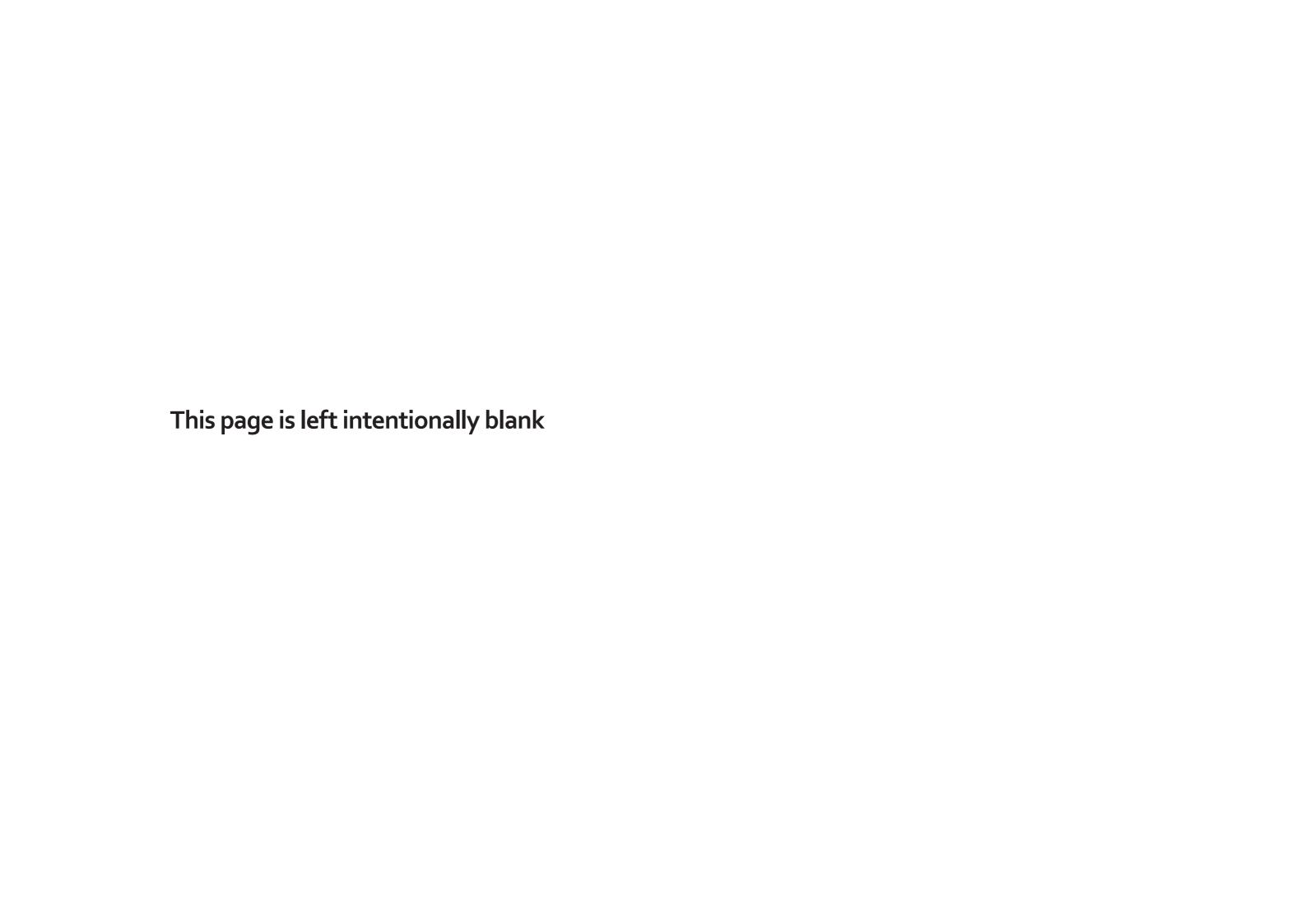


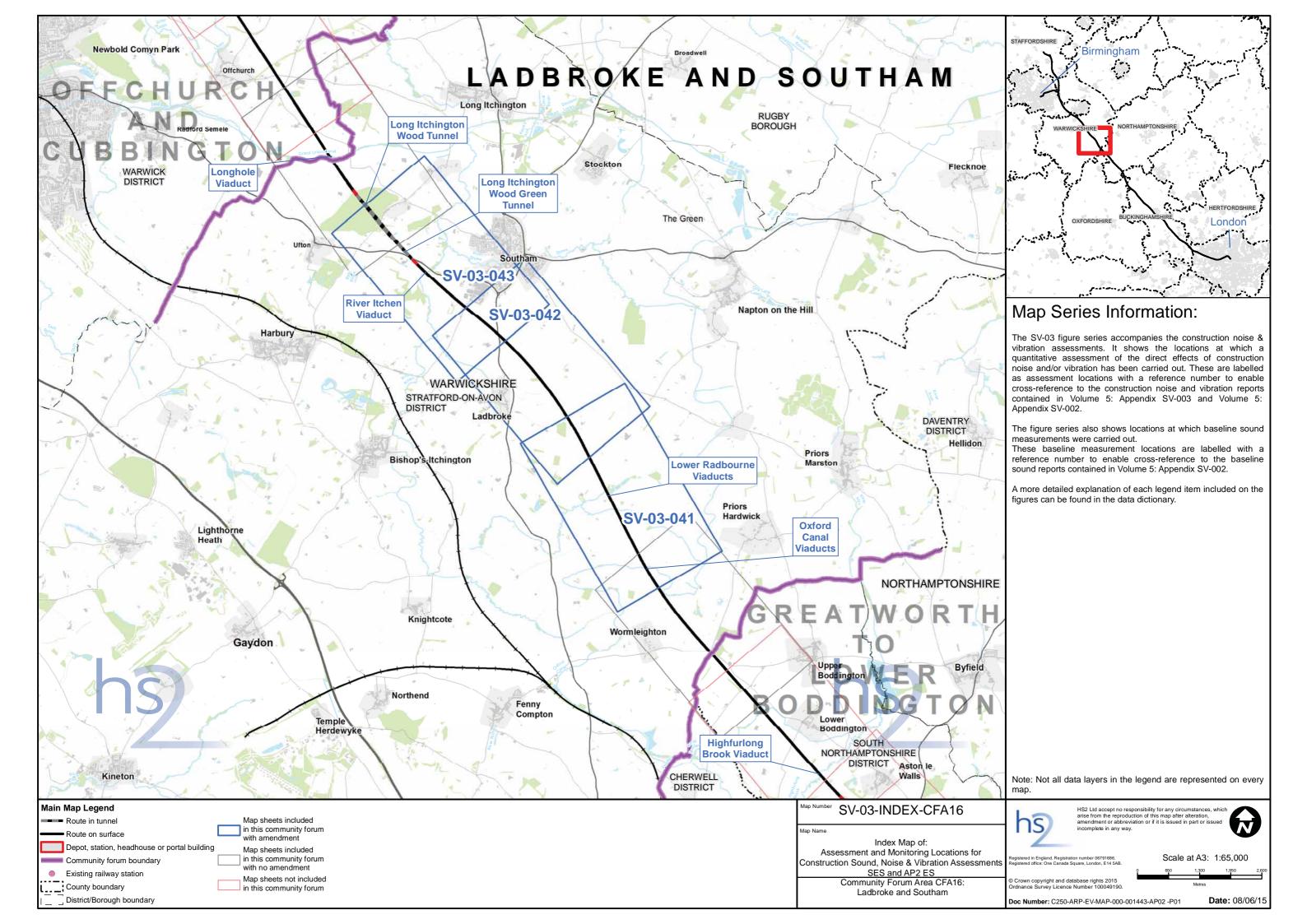


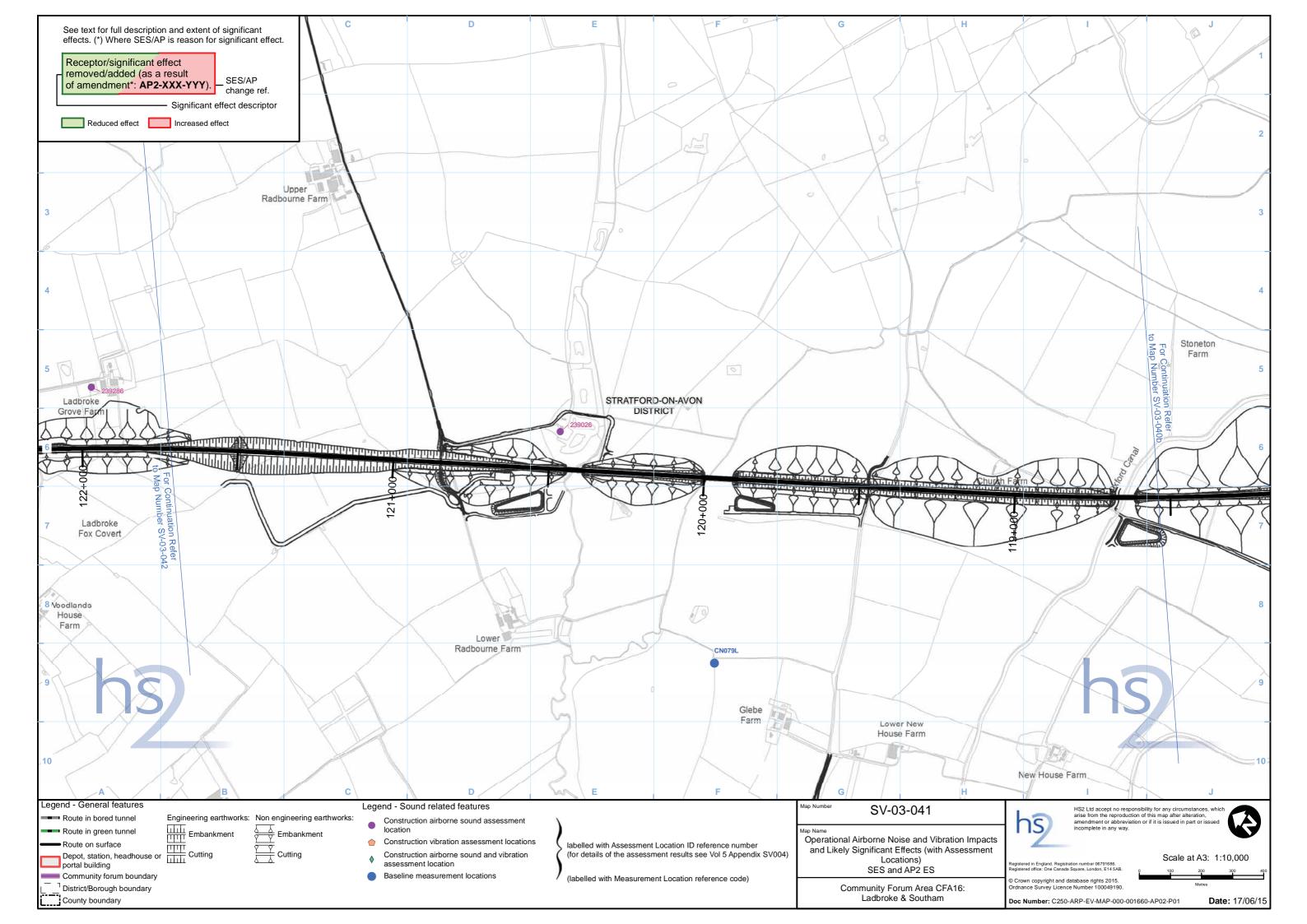


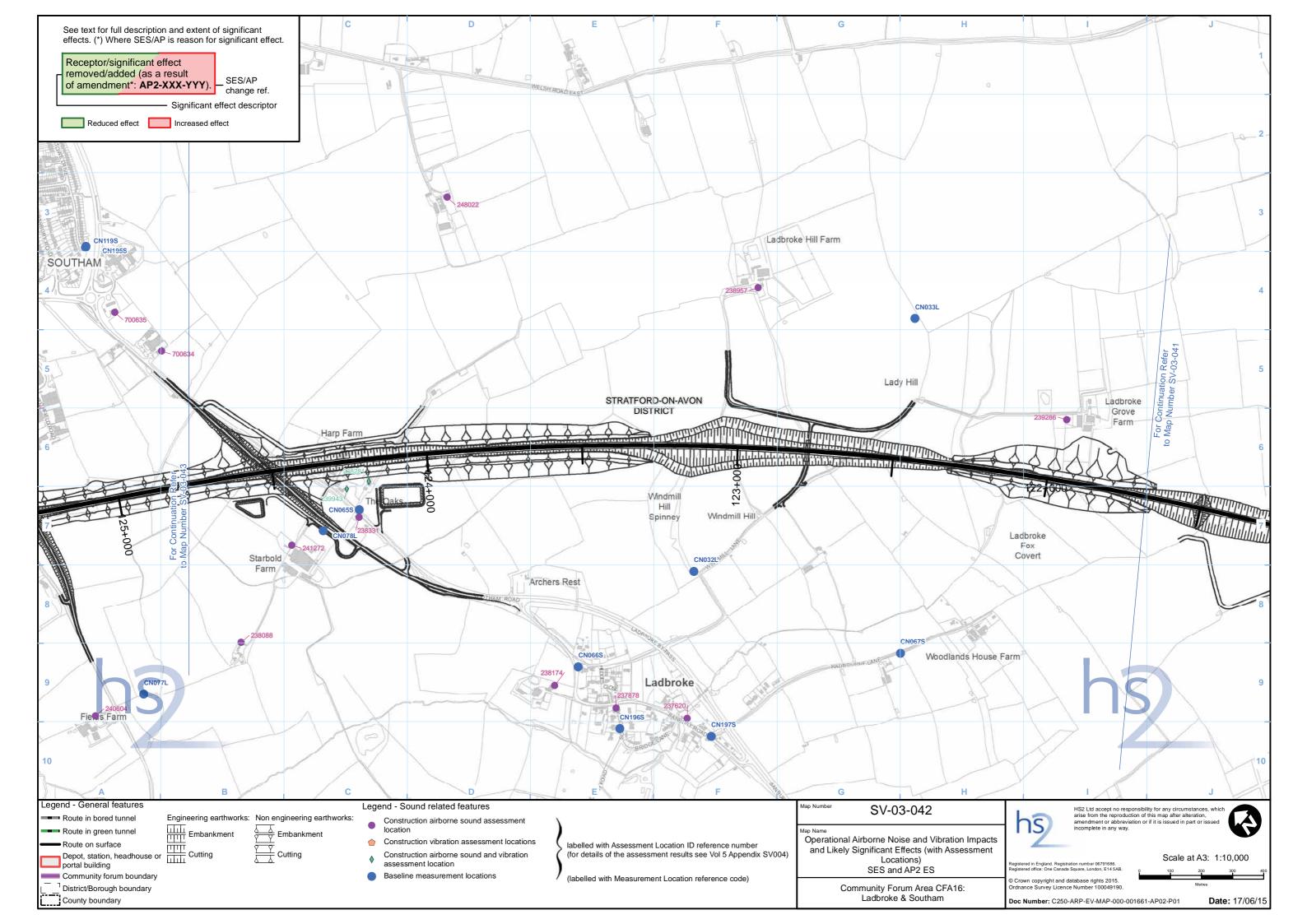


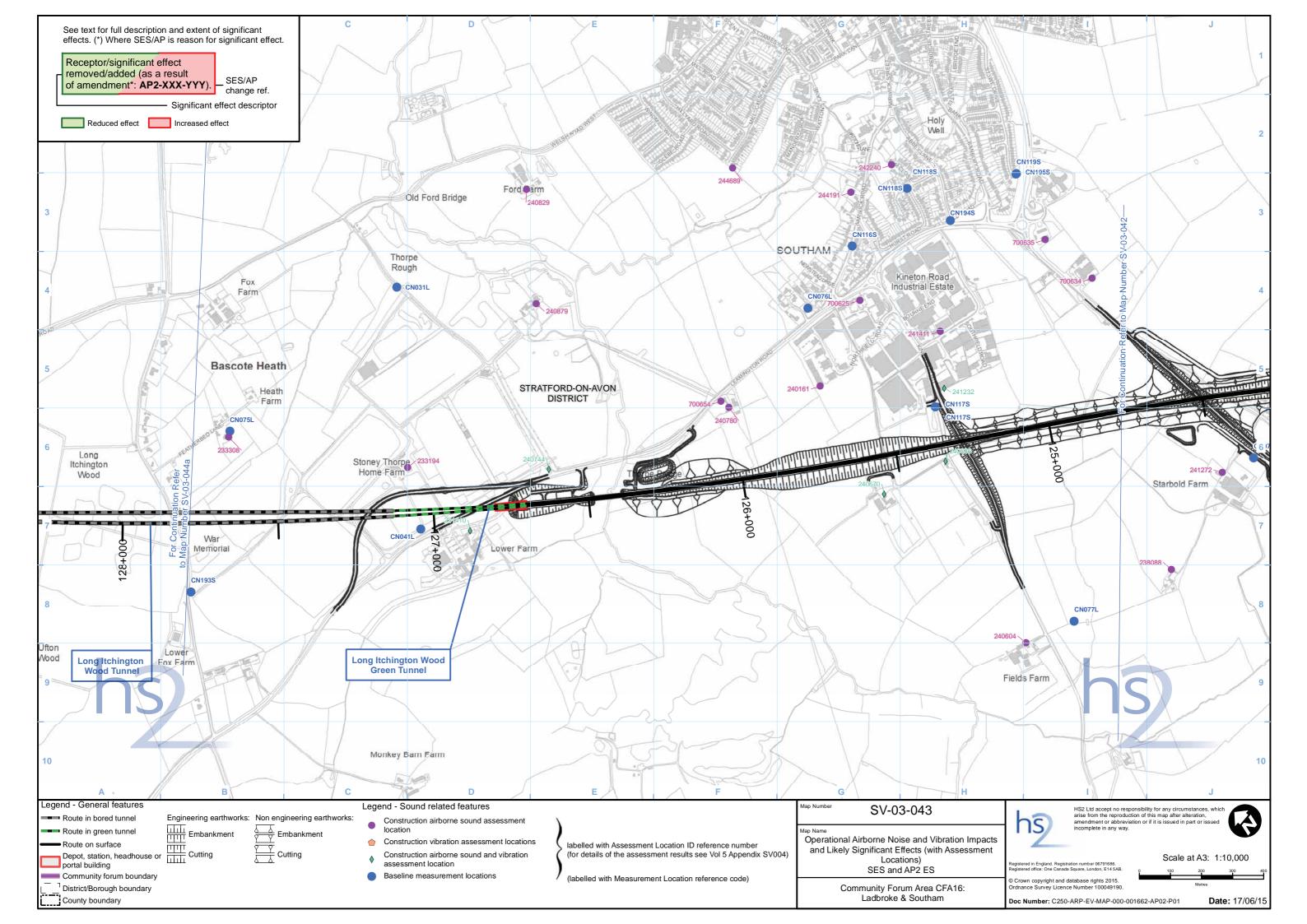












## HIGH SPEED RAIL (LONDON - WEST MIDLANDS)

Supplementary Environmental Statement and Additional Provision 2 Environmental Statement

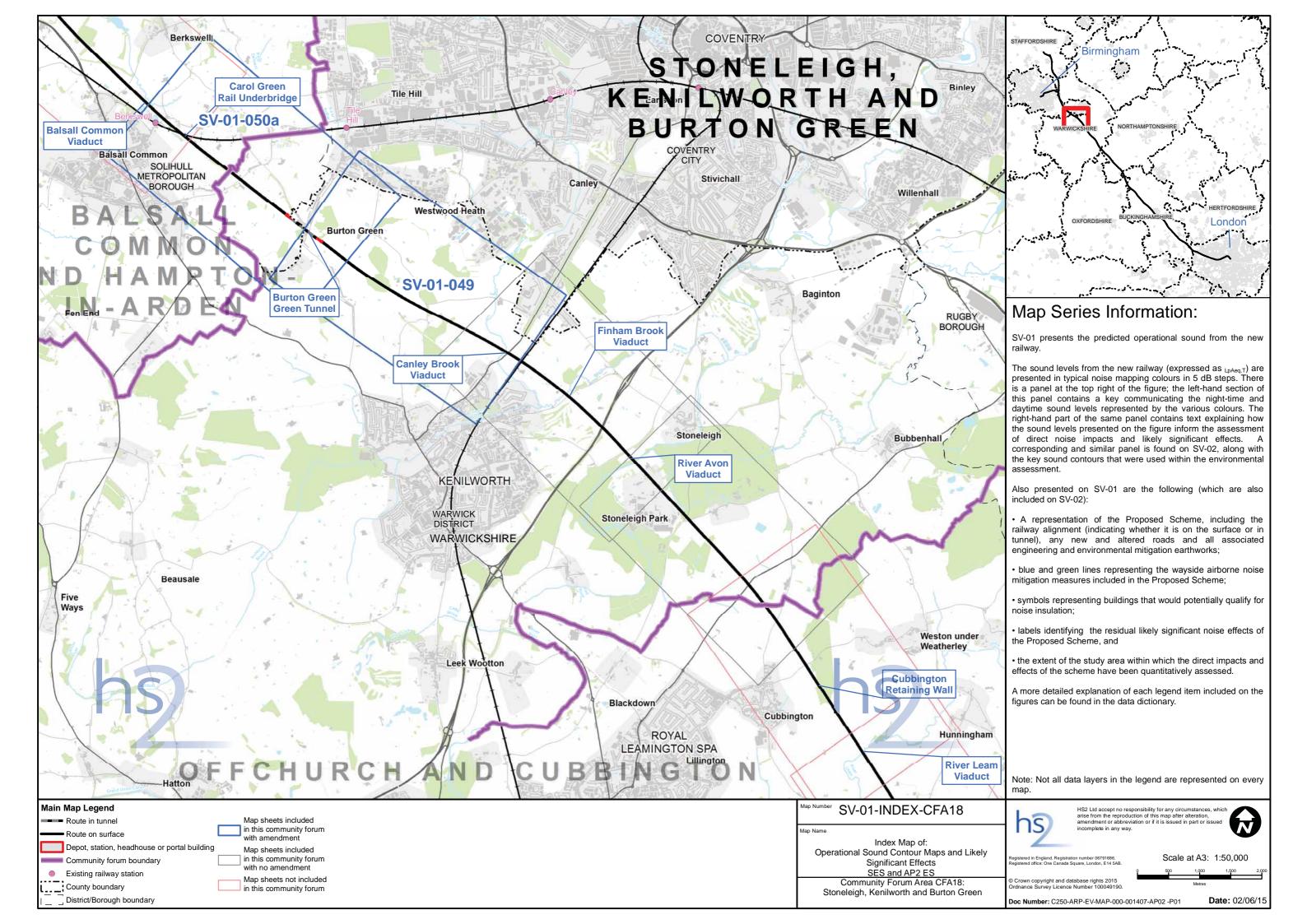
Volume 5 | CFA18 | Stoneleigh, Kenilworth and Burton Green

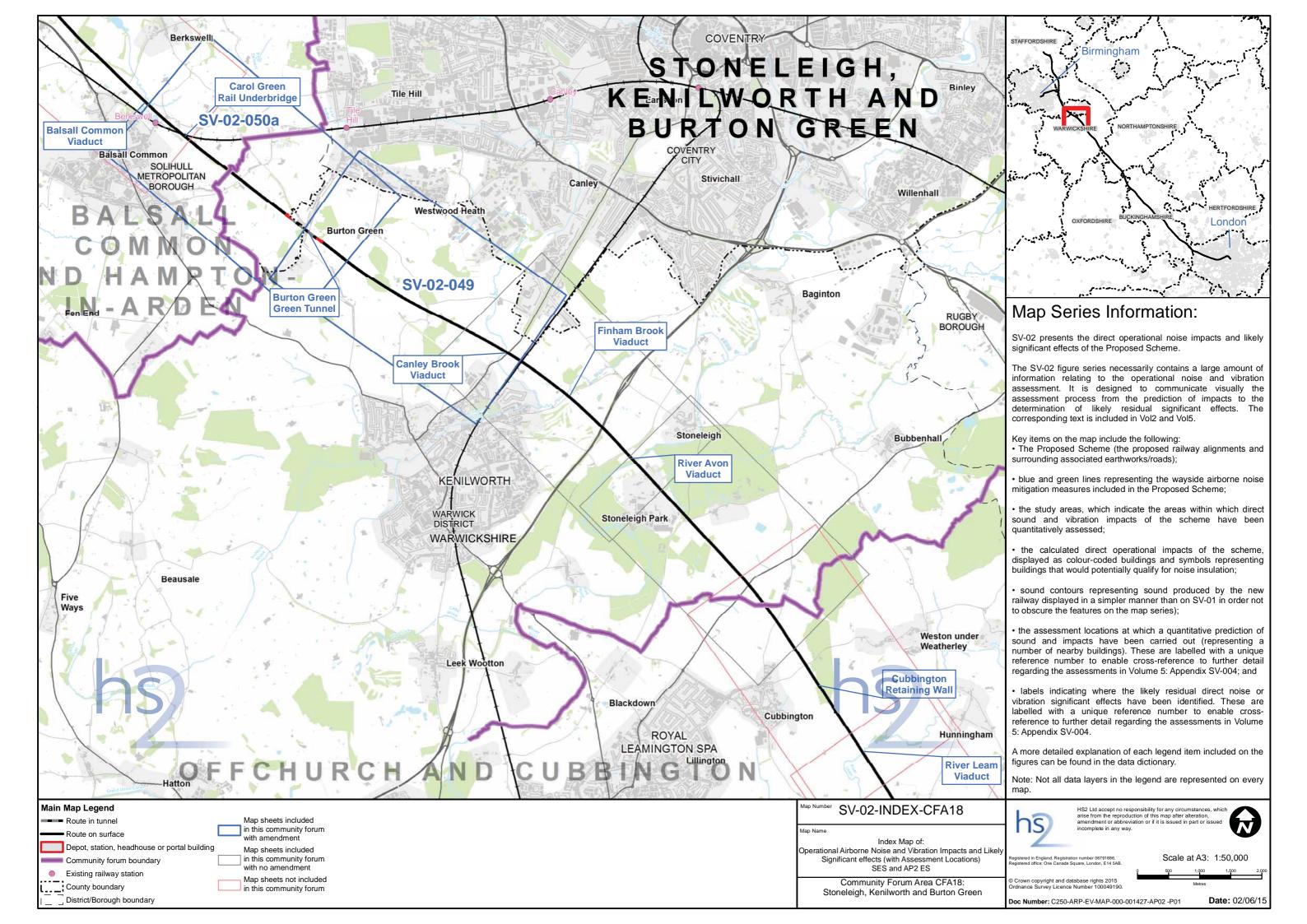
SV-01 – Operational Sound Contour Maps and Likely Significant Effects

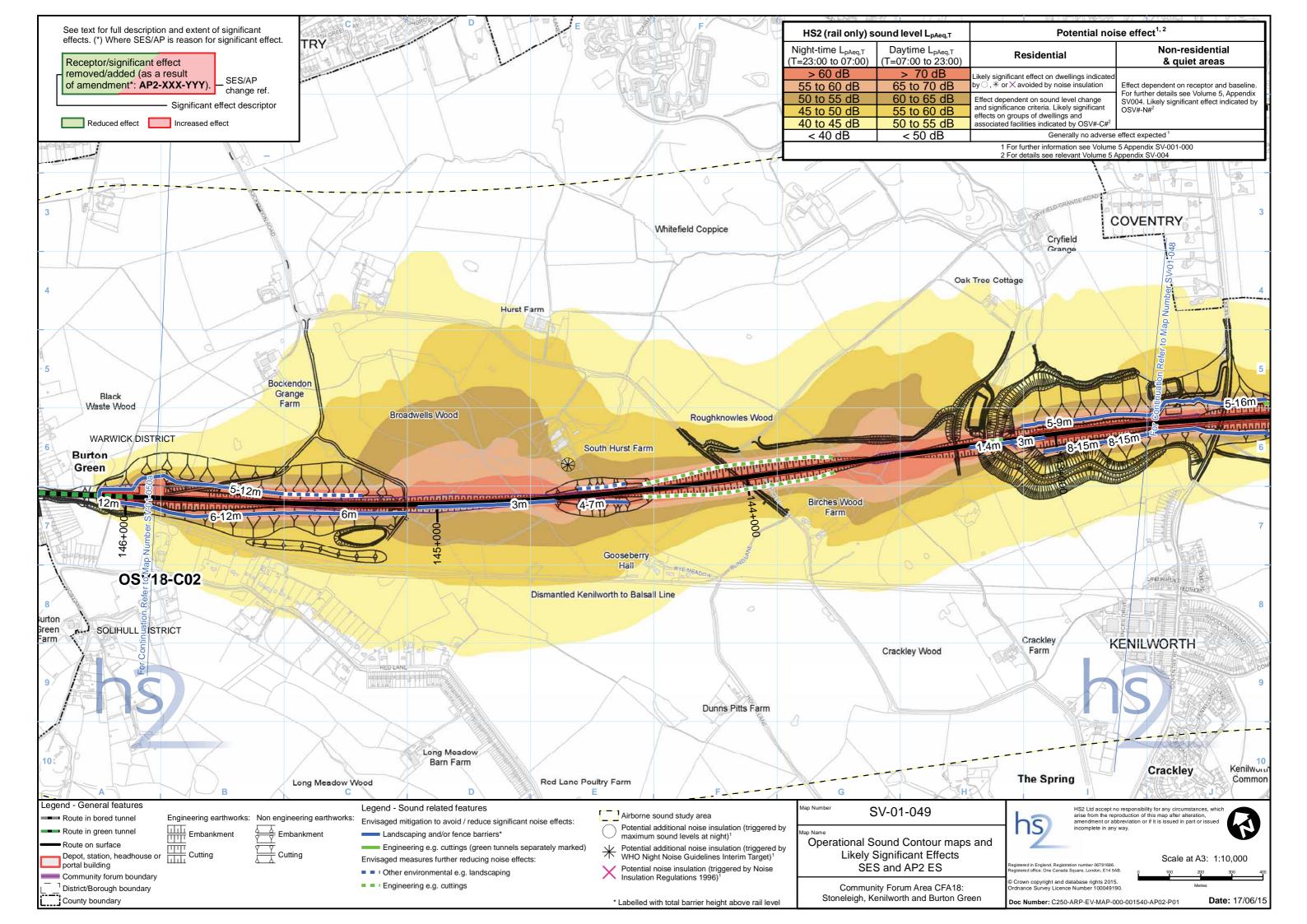
SV-02 – Operational Airborne Noise and Vibration Impacts and Likely Significant Effects (with Assessment Locations)

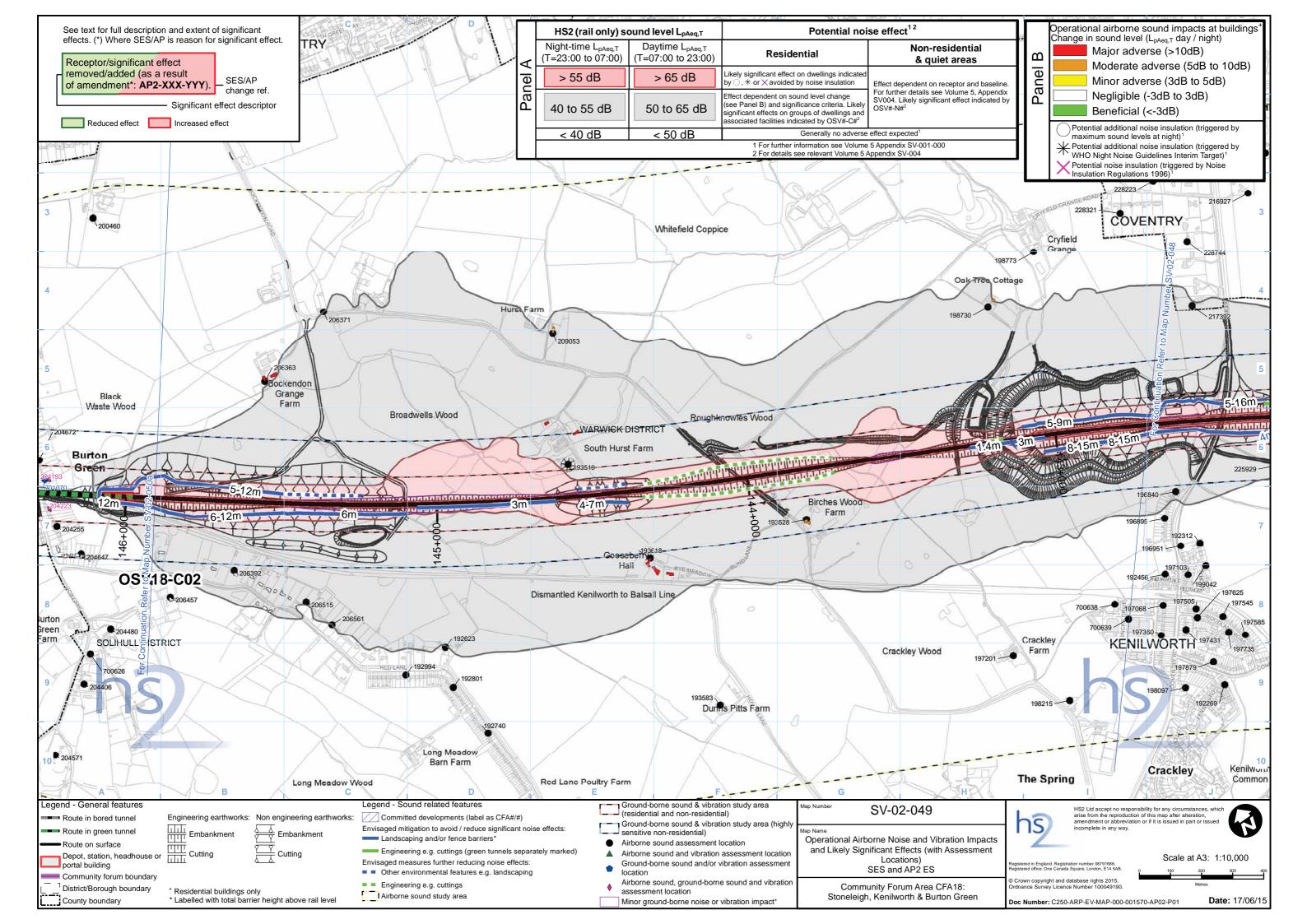
SV-03 – Assessment and Monitoring Locations for Construction Sound, Noise & Vibration Assessments

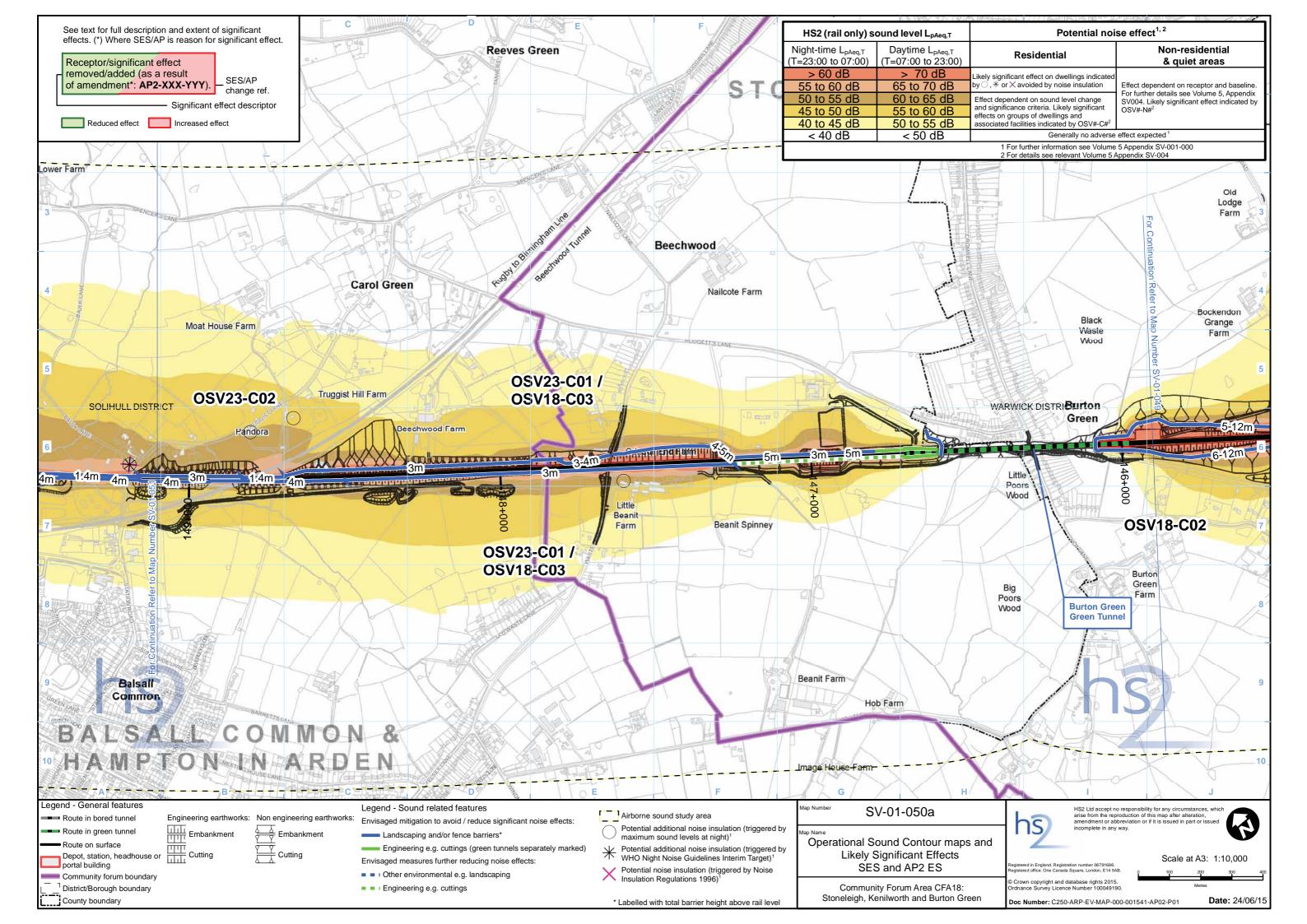
SV-04 – Assessment and Monitoring Locations for Operational Sound, Noise & Vibration Assessments

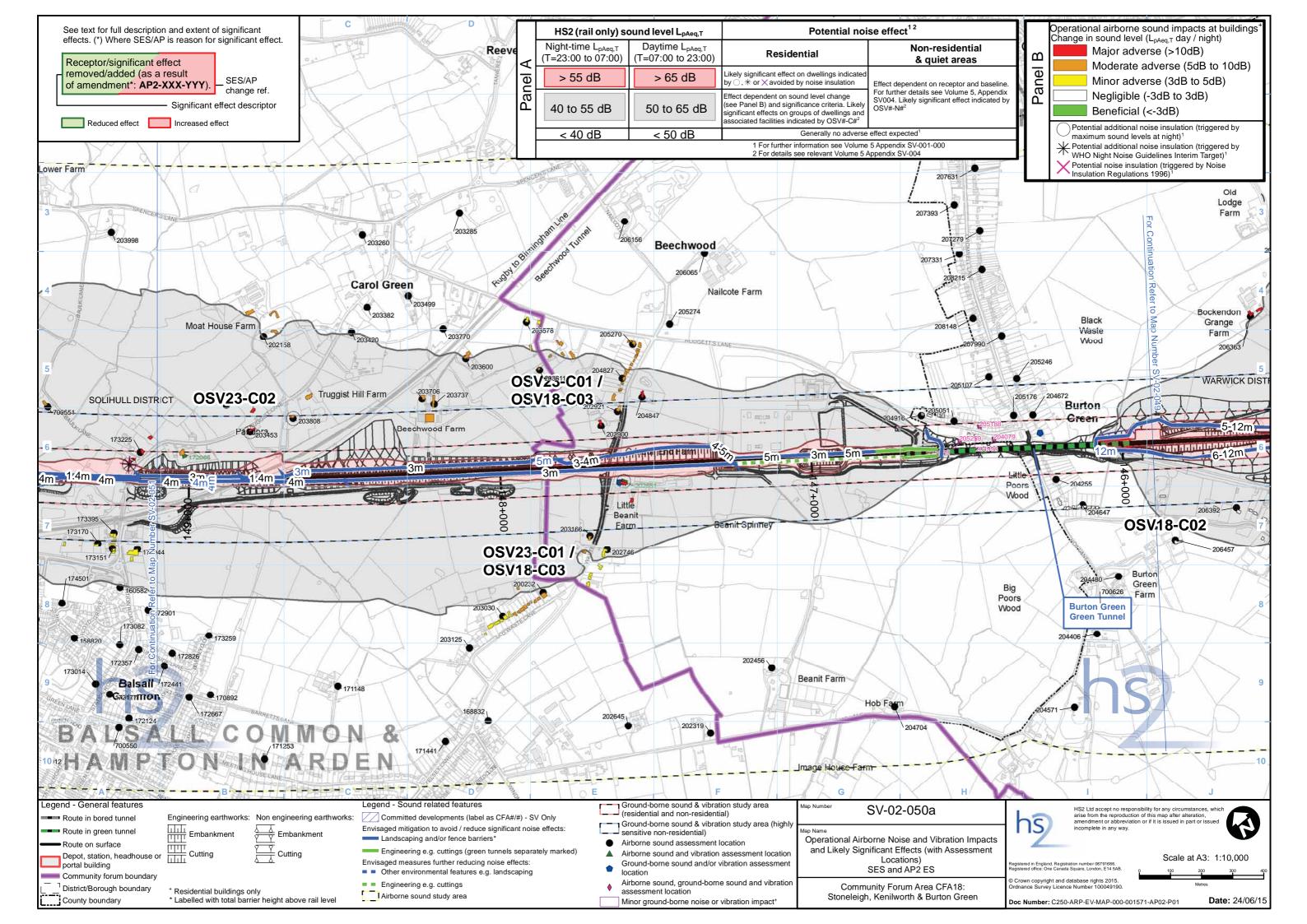


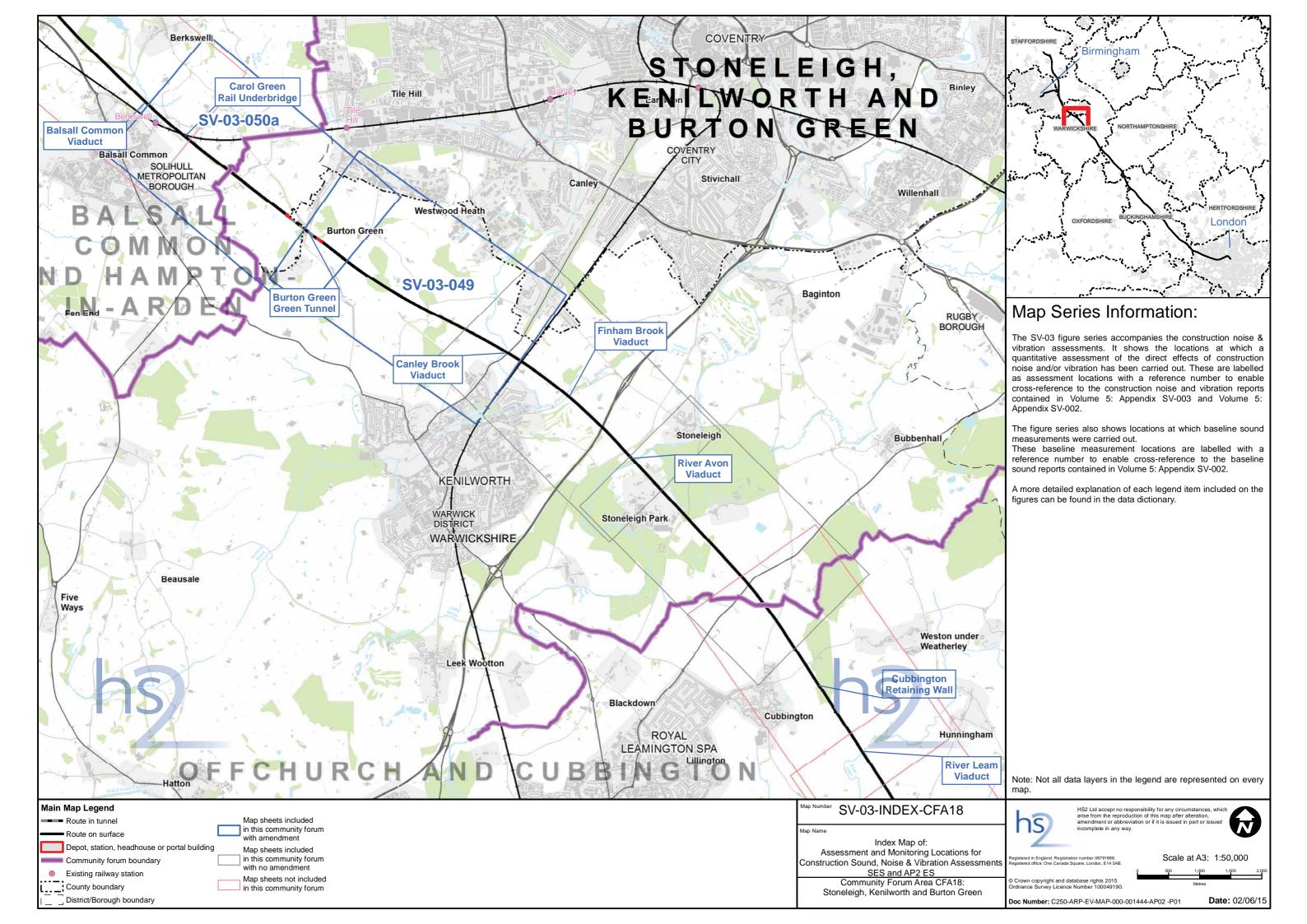


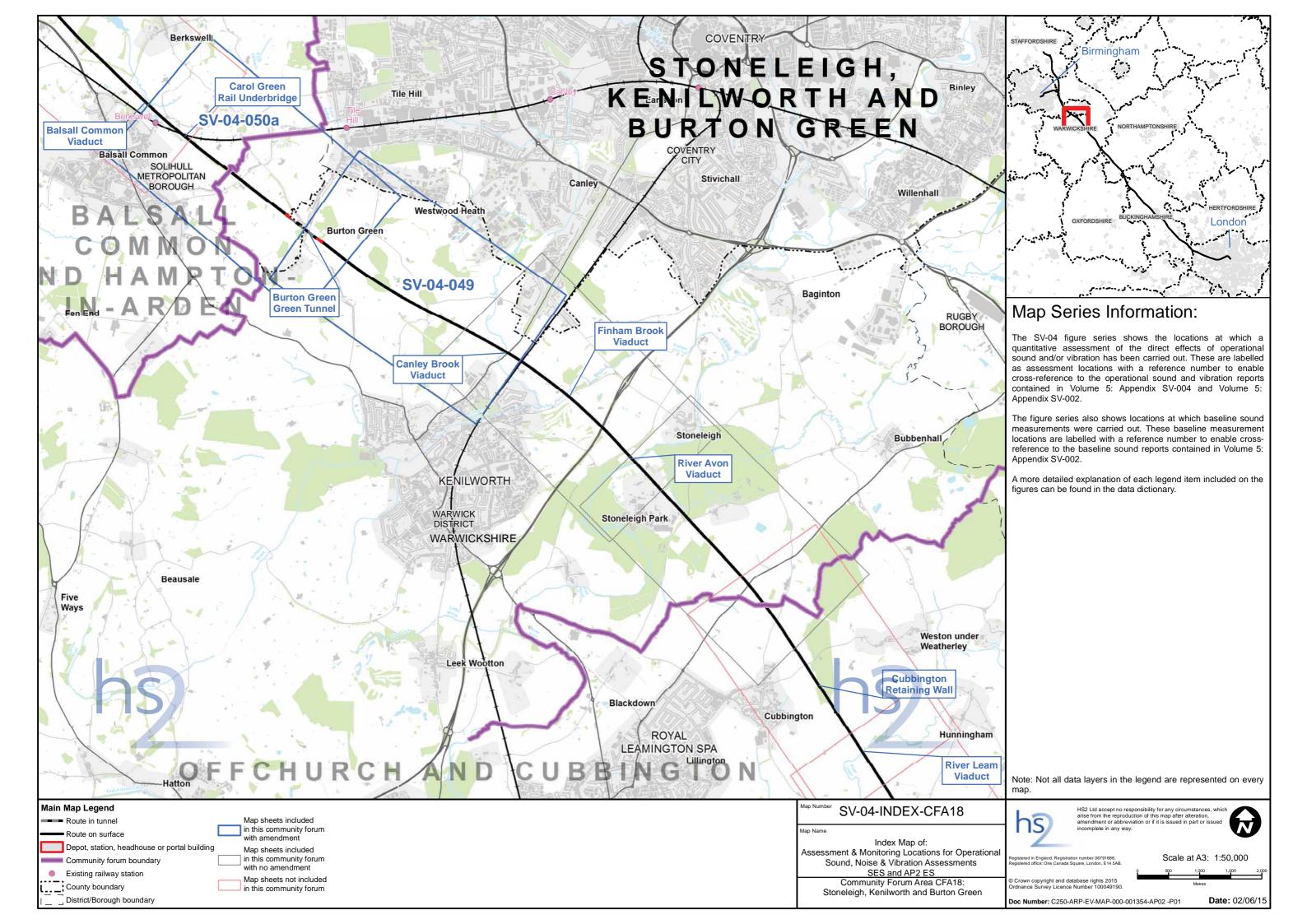


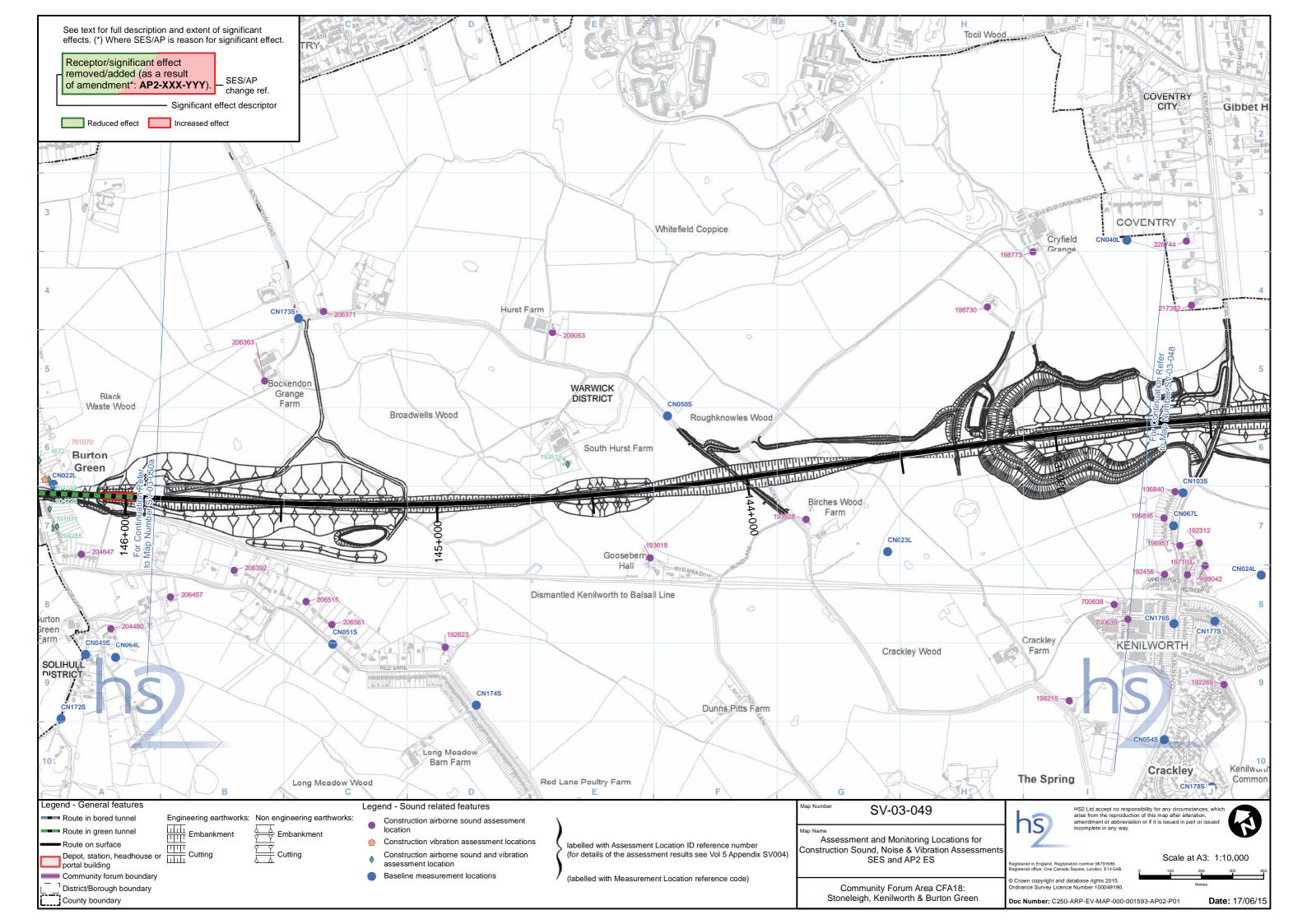


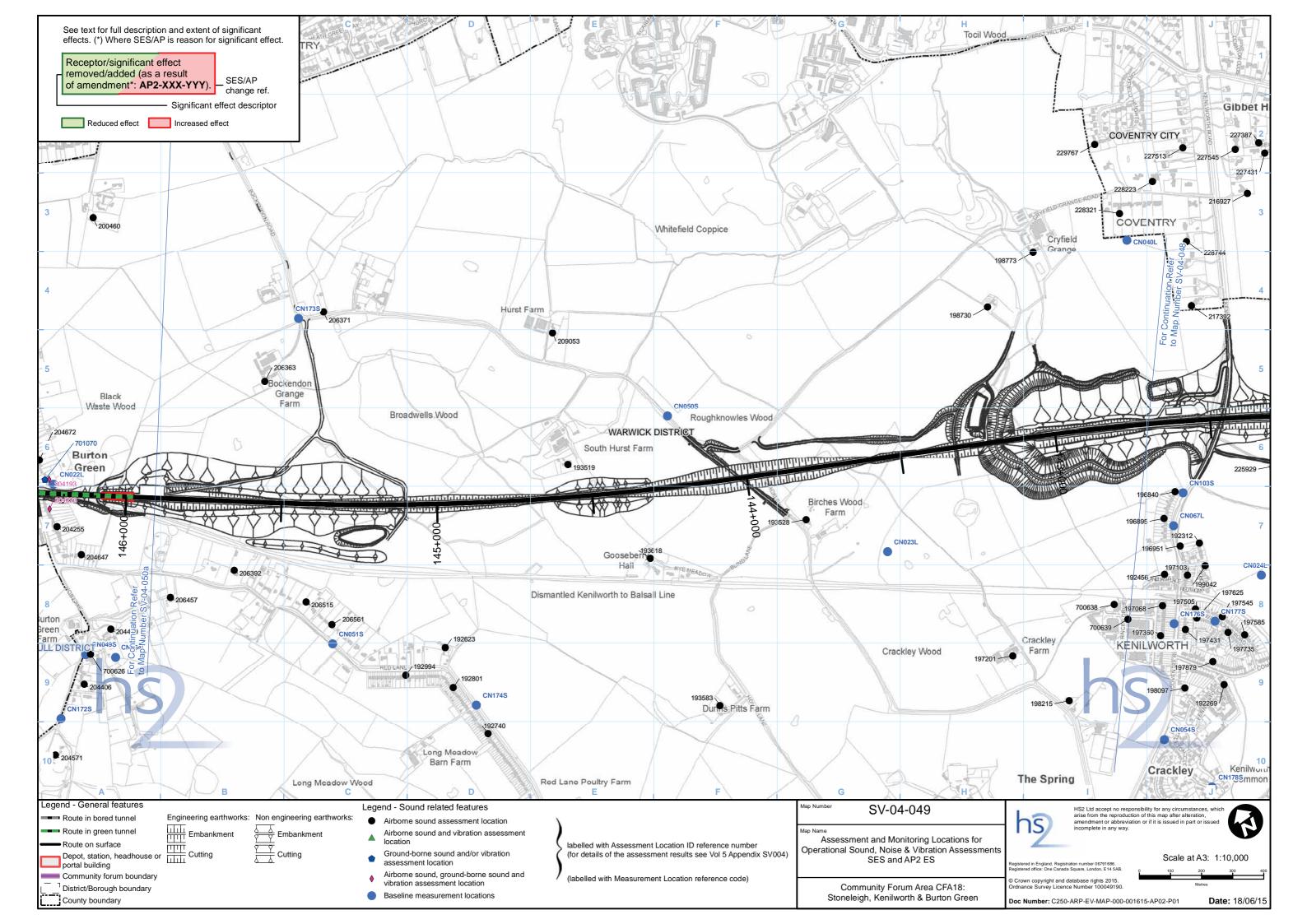


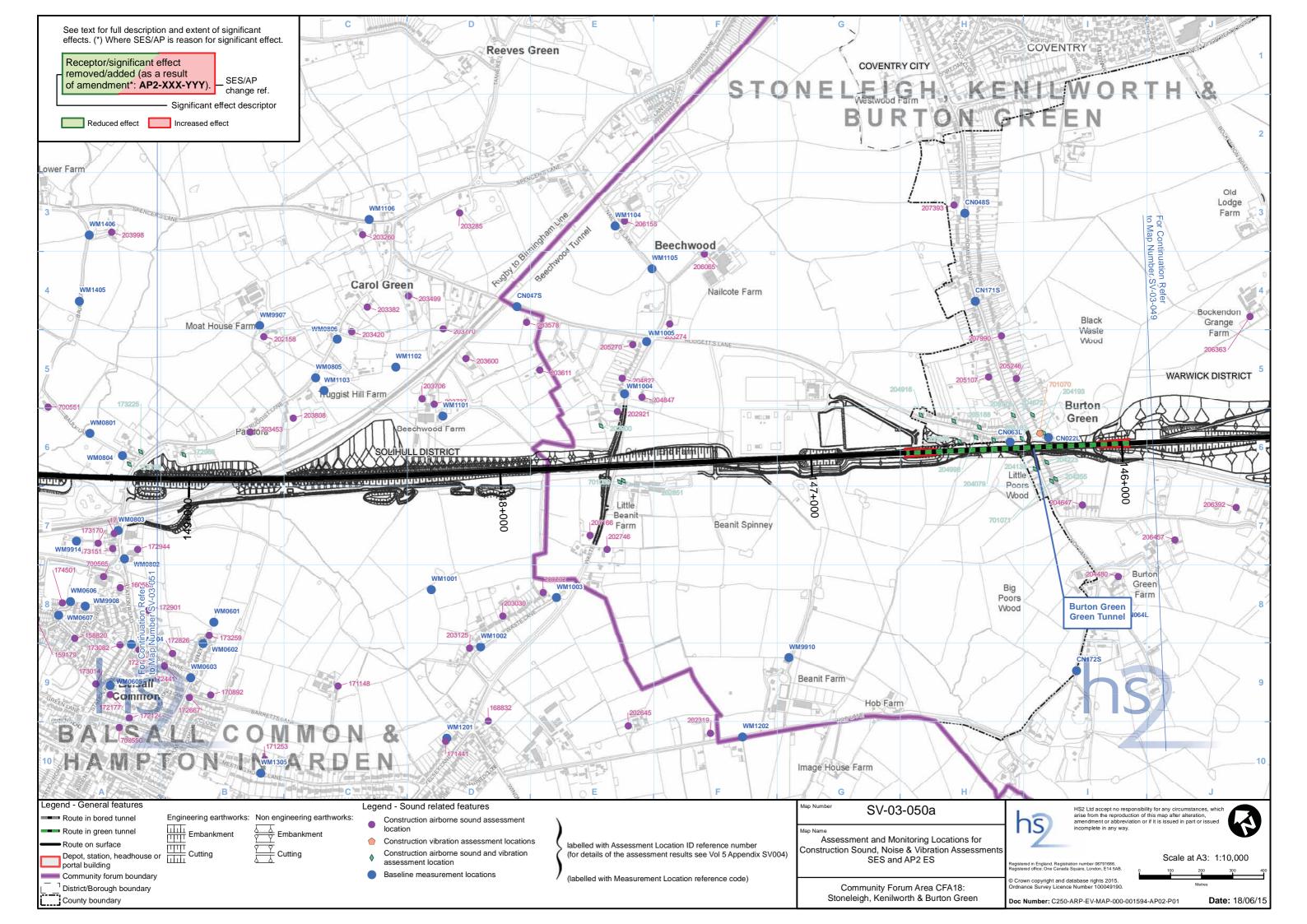


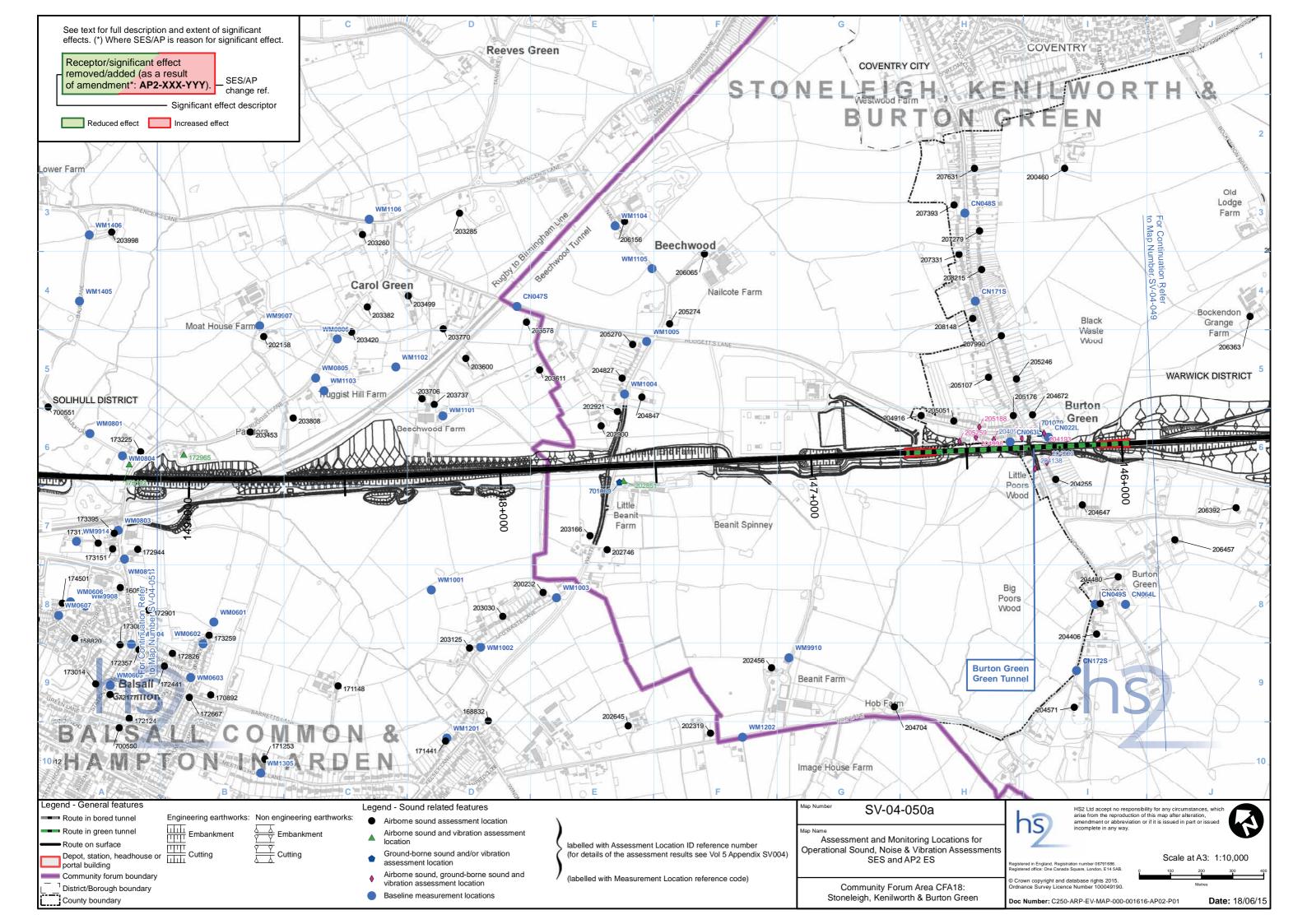


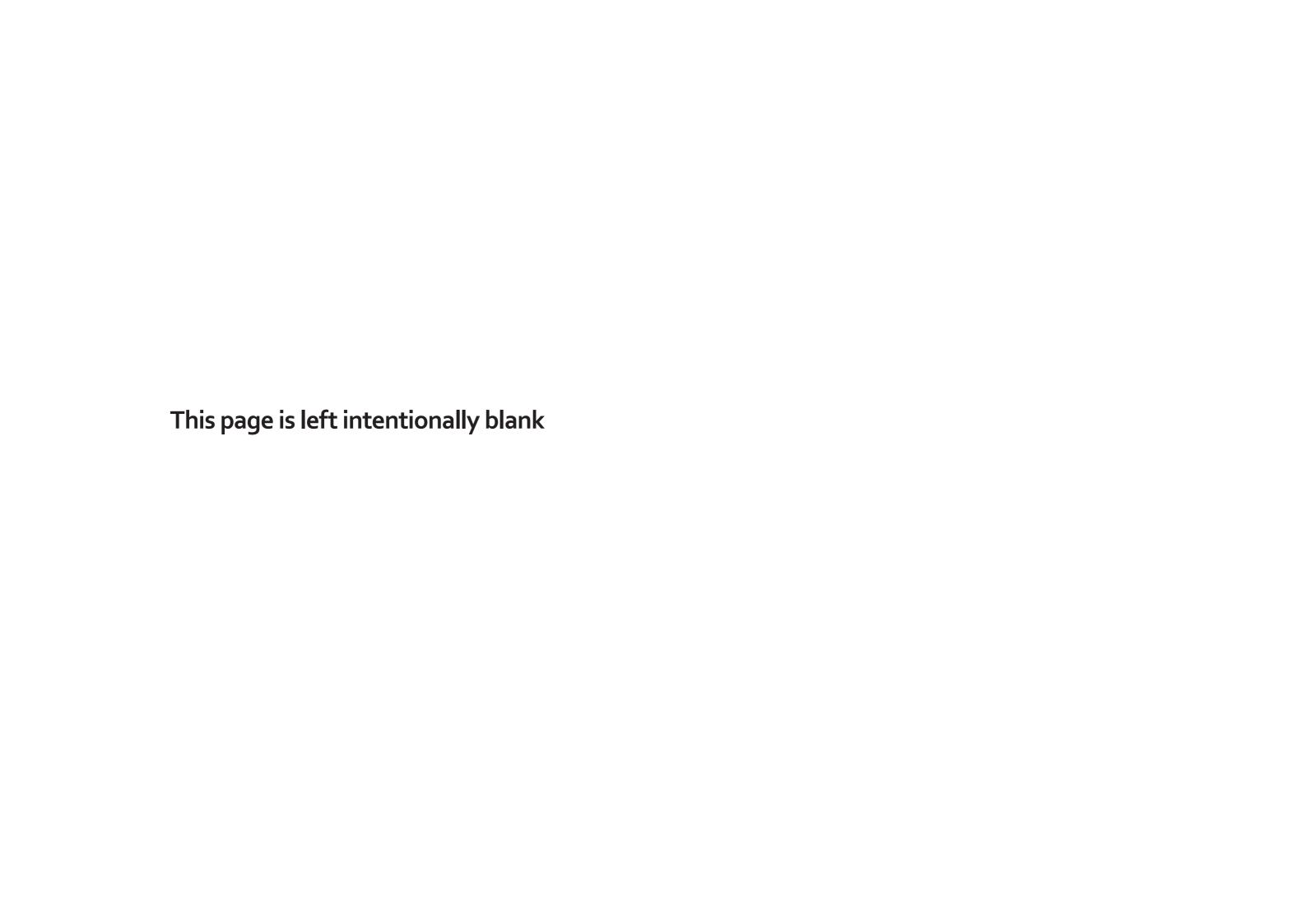












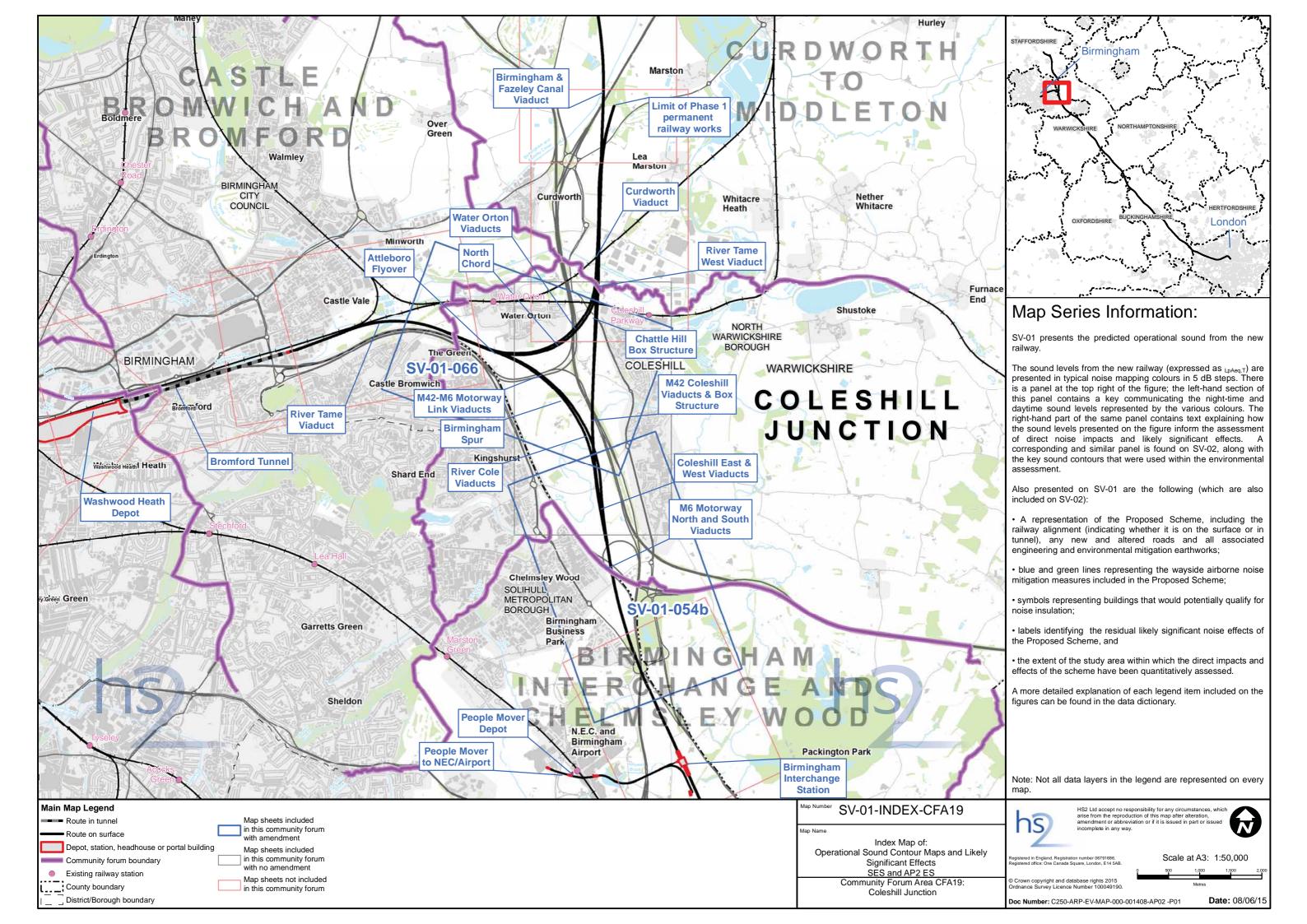
## HIGH SPEED RAIL (LONDON - WEST MIDLANDS)

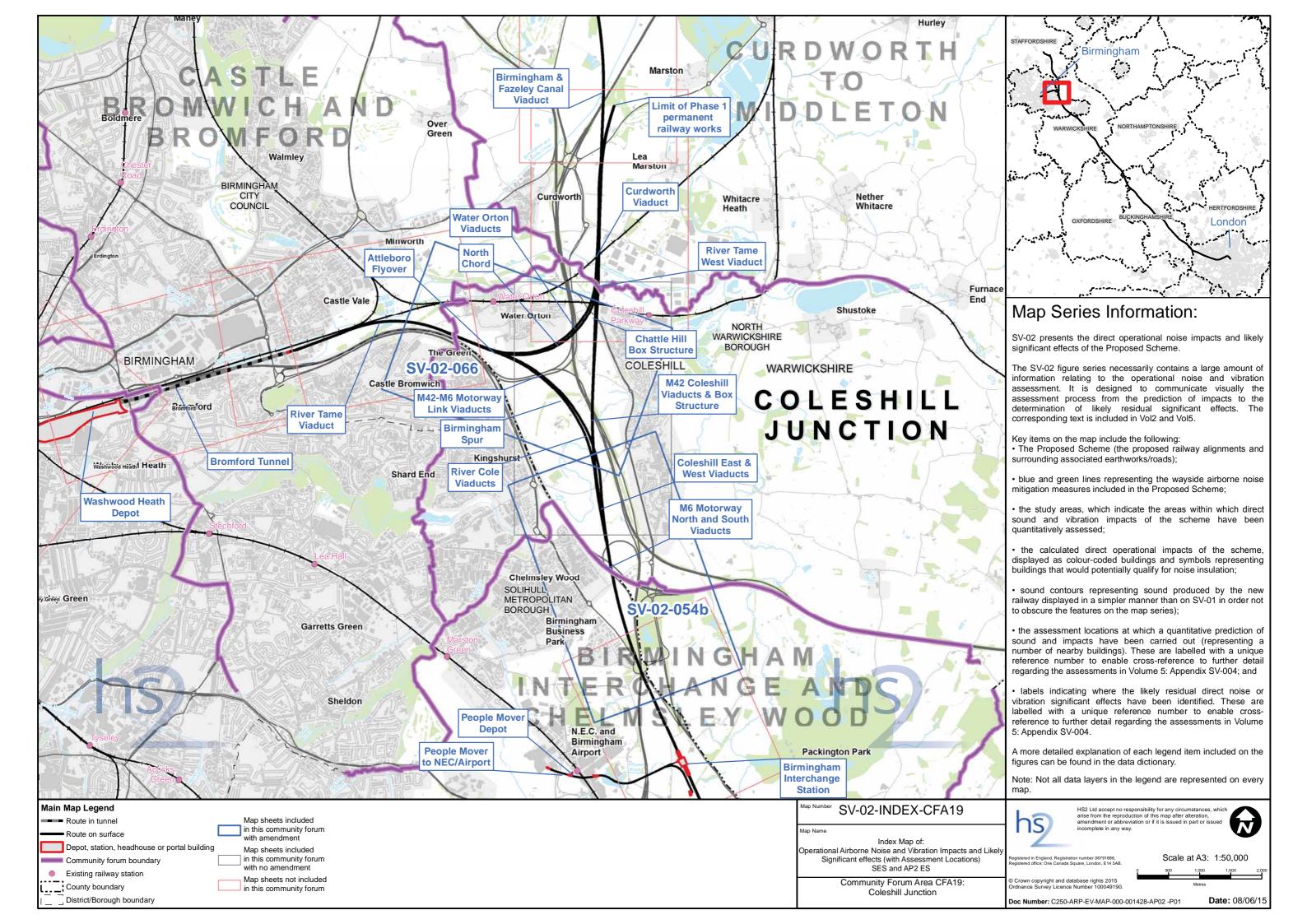
Supplementary Environmental Statement and Additional Provision 2 Environmental Statement

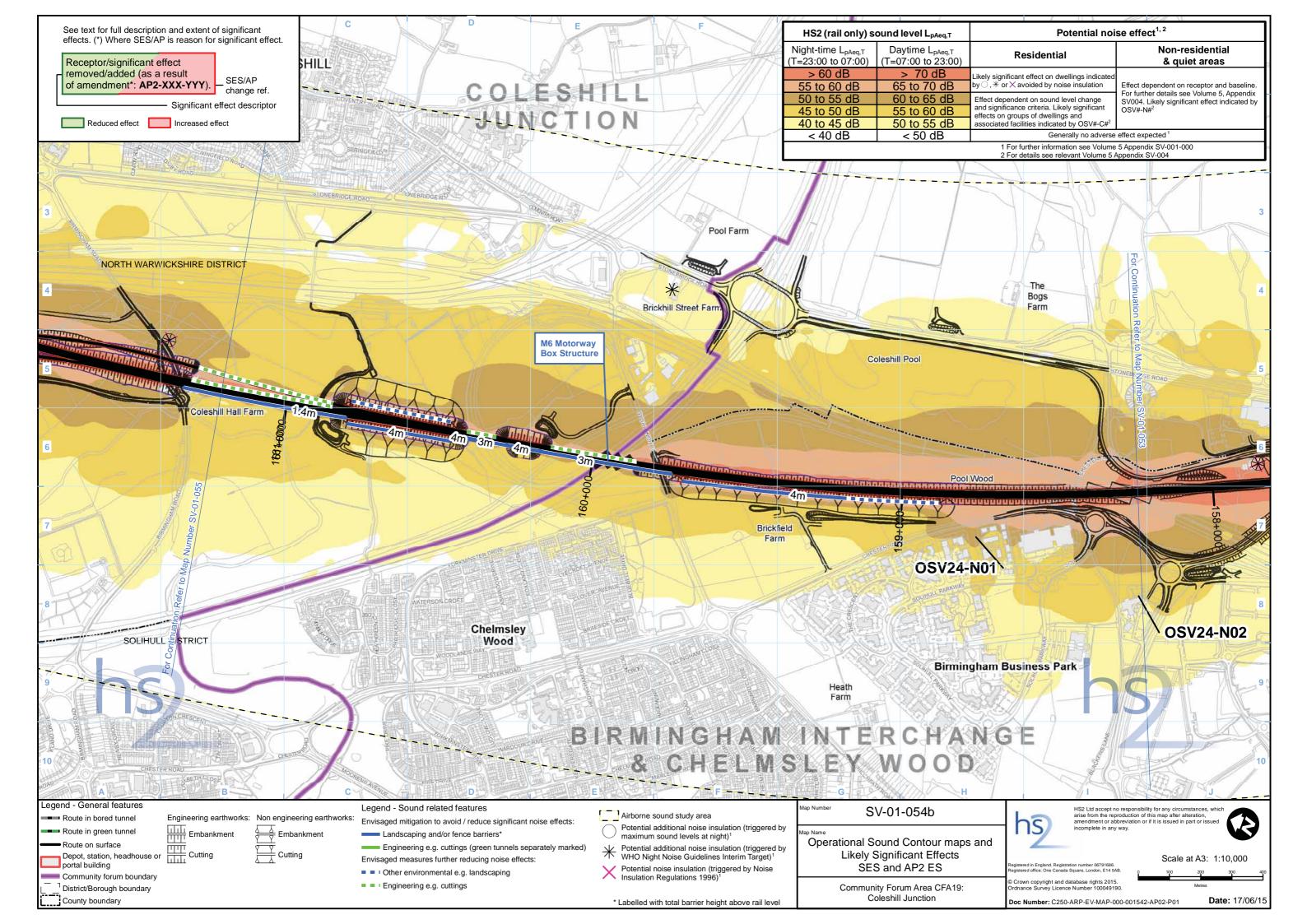
Volume 5 | CFA19 | Coleshill Junction

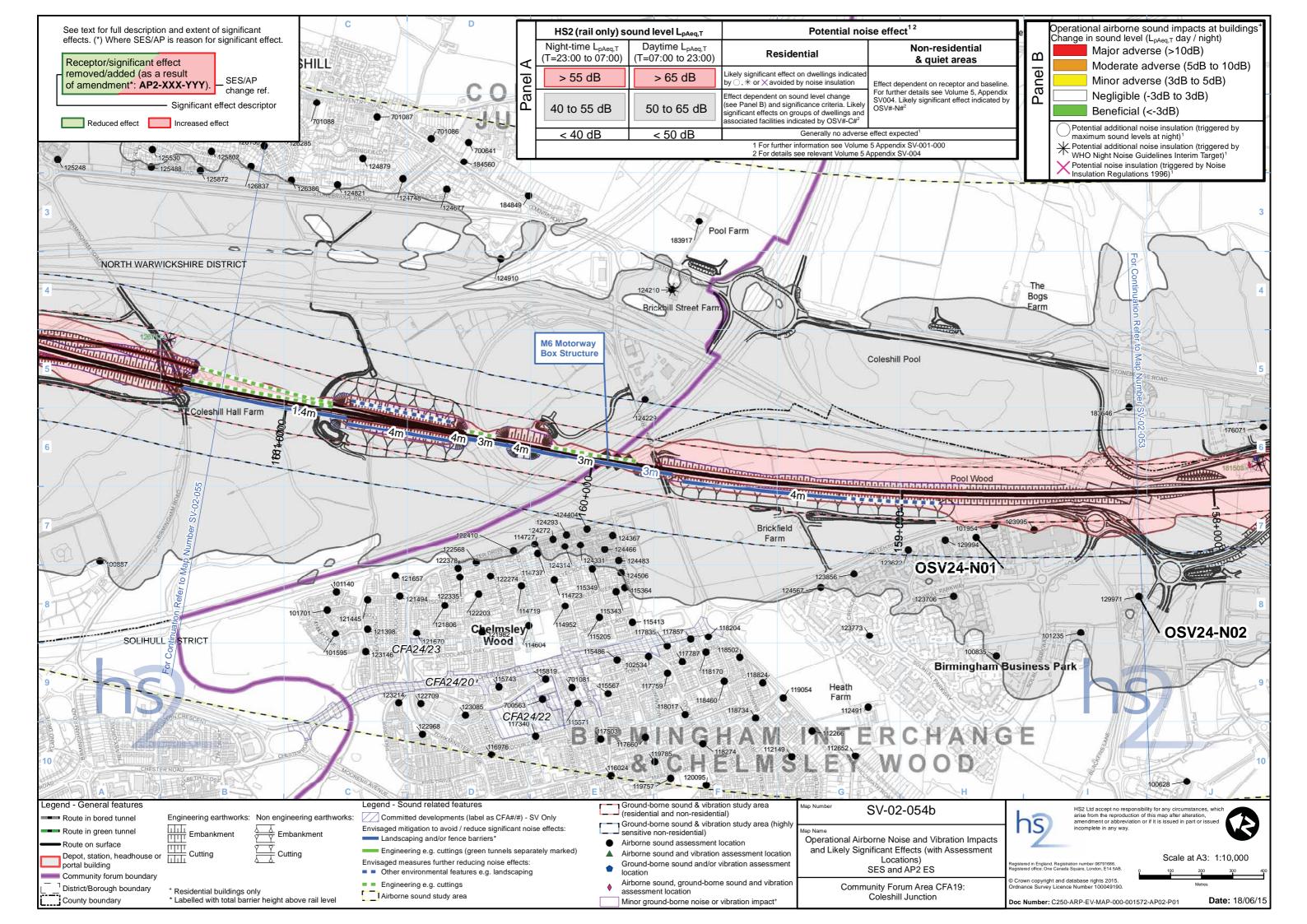
SV-01 – Operational Sound Contour Maps and Likely Significant Effects

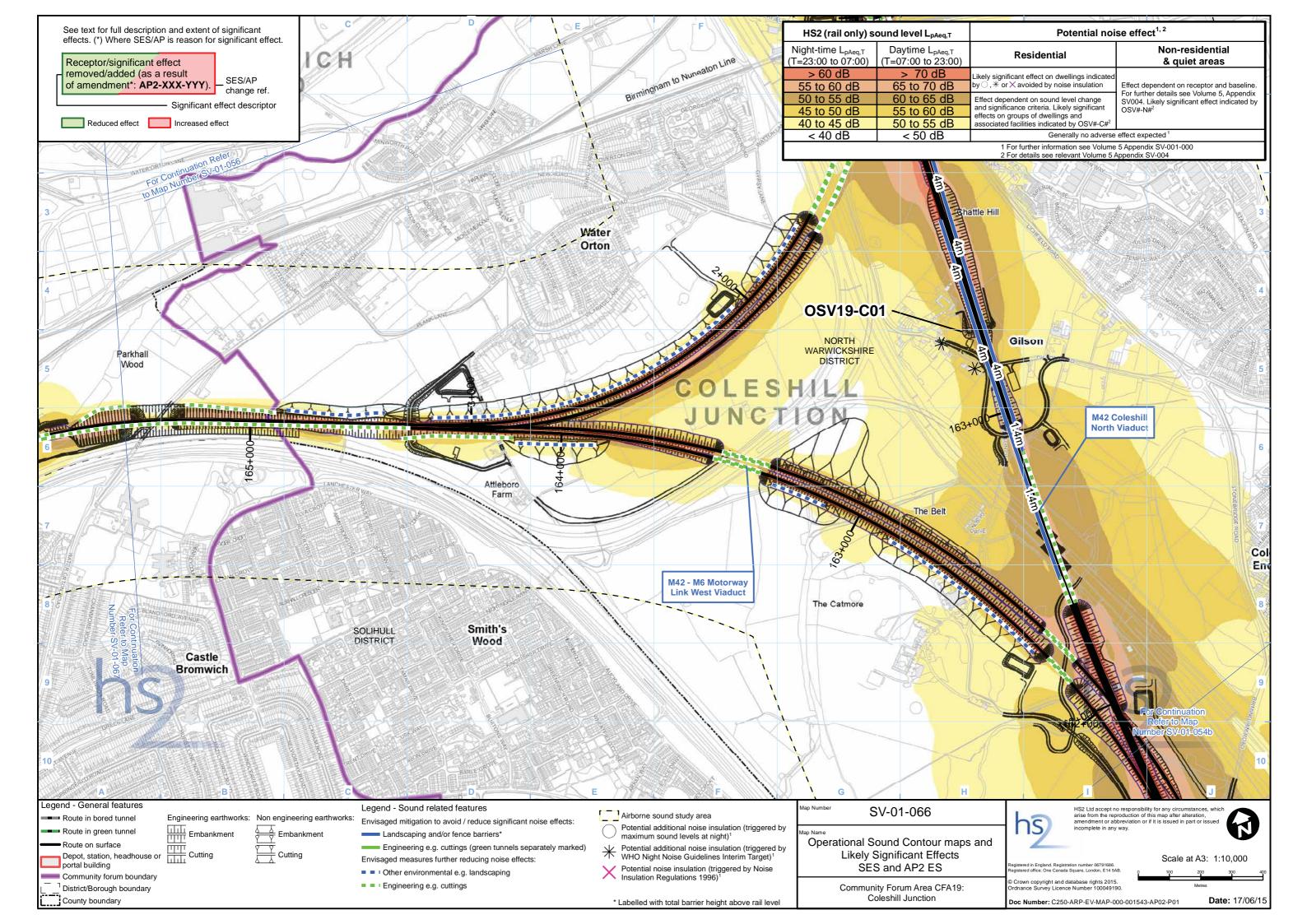
SV-02 – Operational Airborne Noise and Vibration Impacts and Likely Significant Effects (with Assessment Locations)

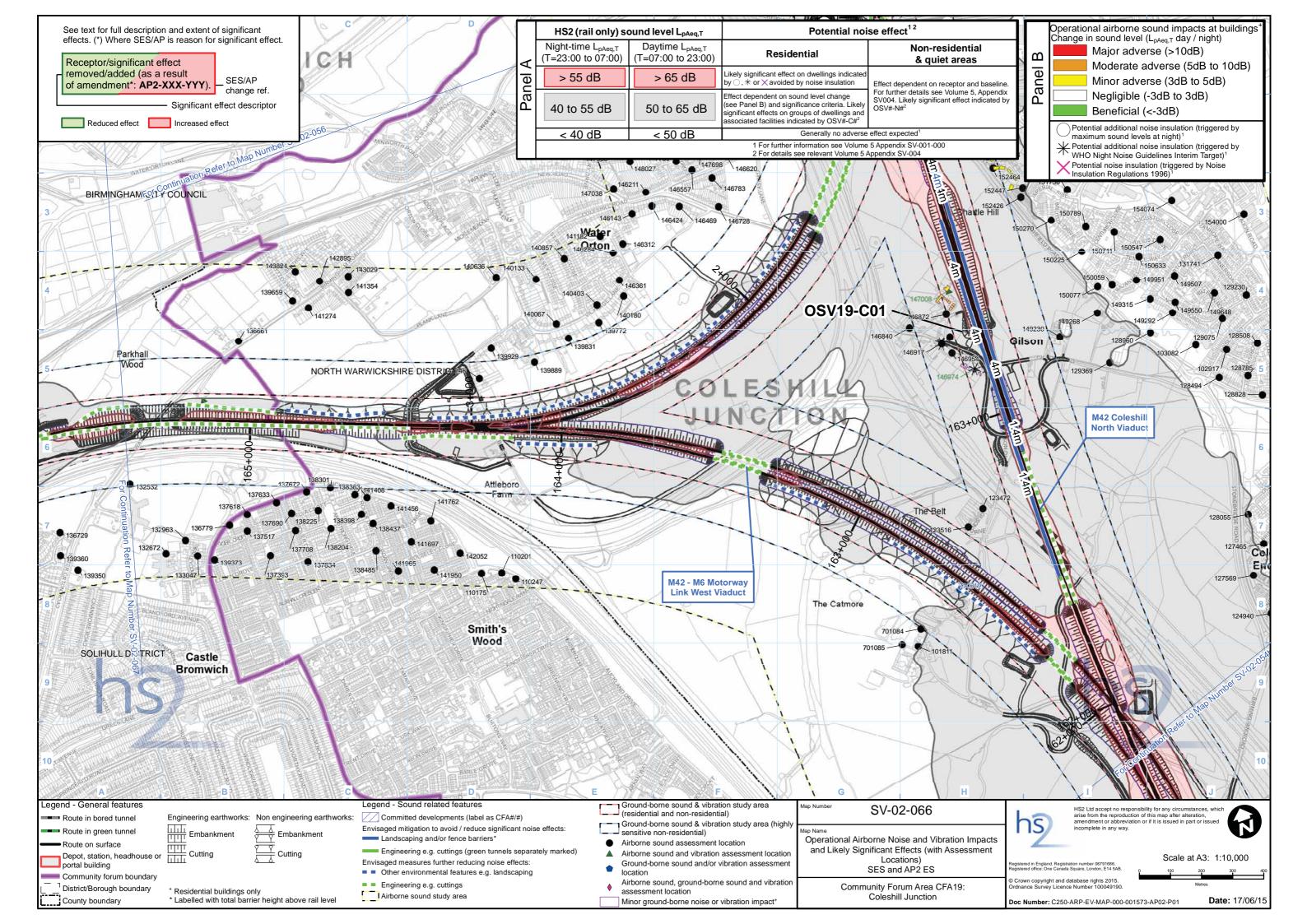


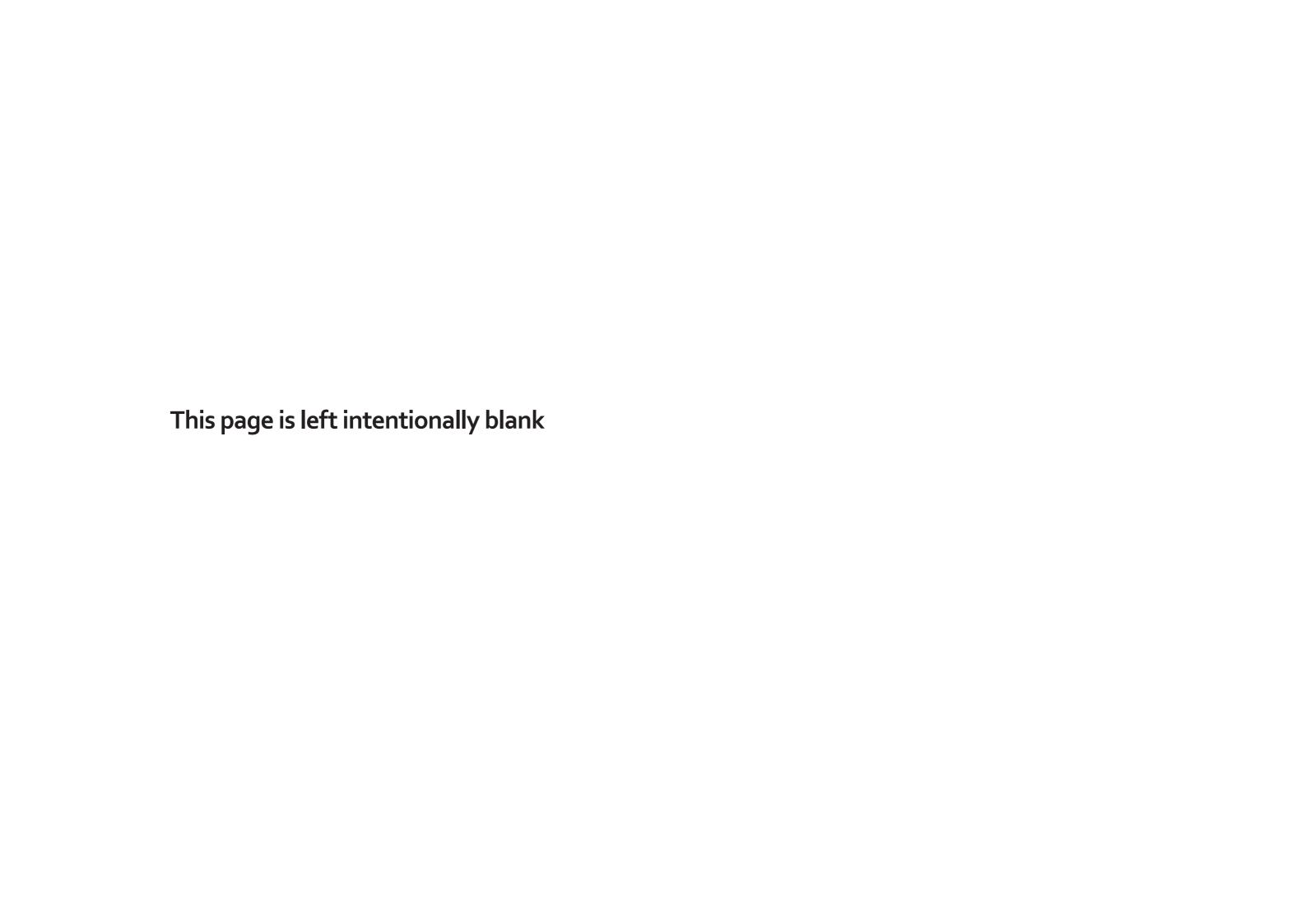












## HIGH SPEED RAIL (LONDON - WEST MIDLANDS)

Supplementary Environmental Statement and Additional Provision 2 Environmental Statement

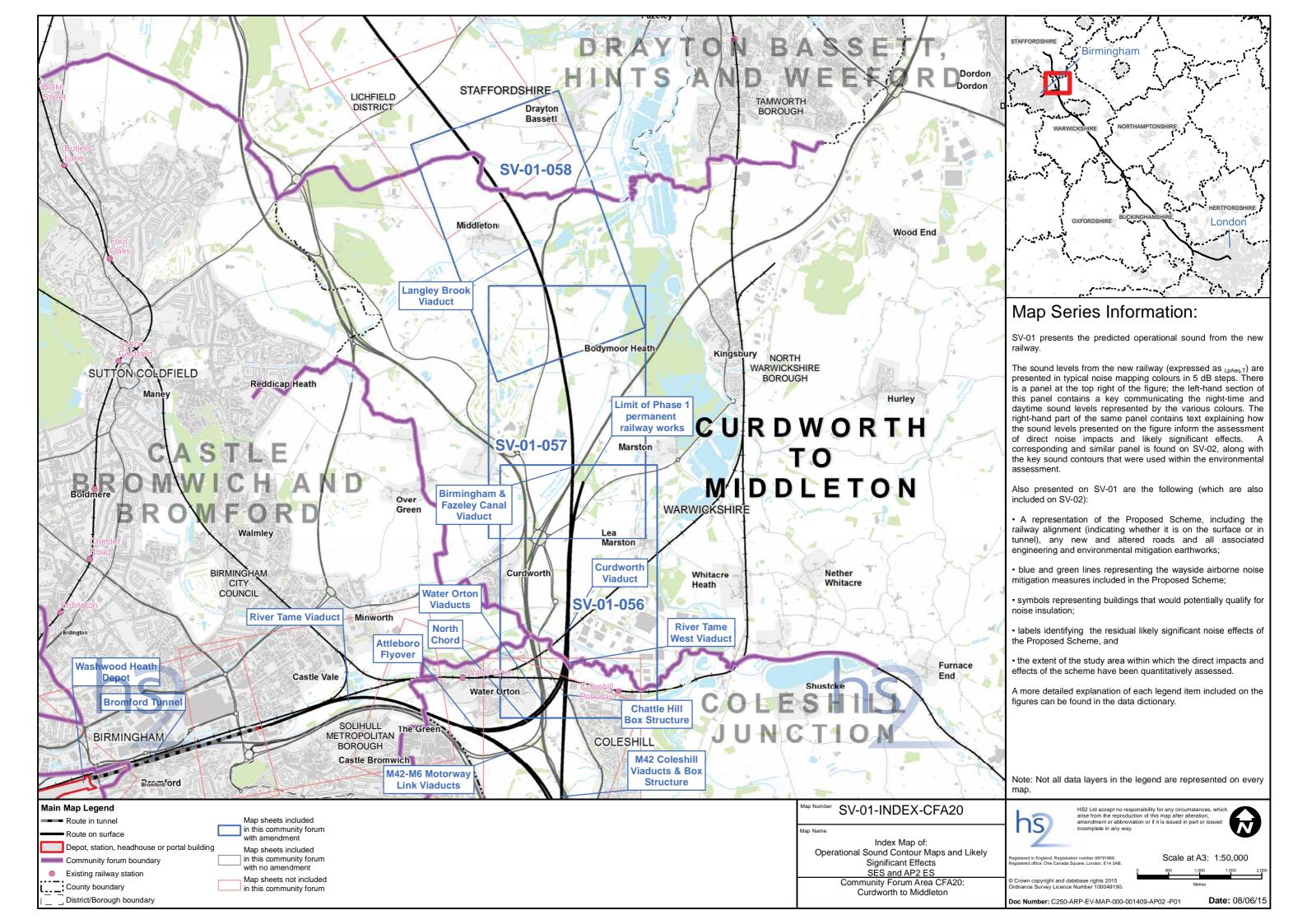
Volume 5 | CFA20 | Curdworth to Middleton

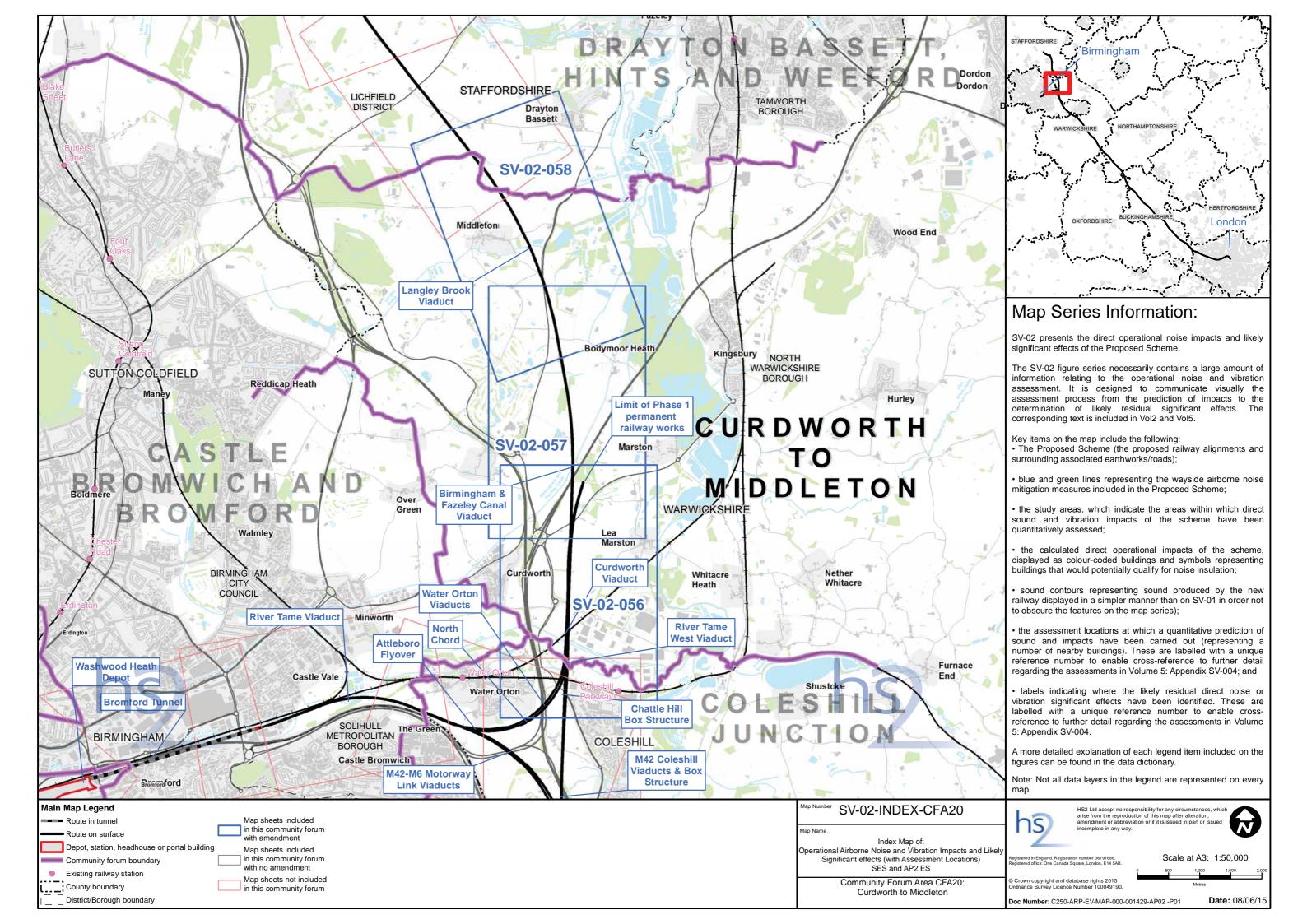
SV-01 – Operational Sound Contour Maps and Likely Significant Effects

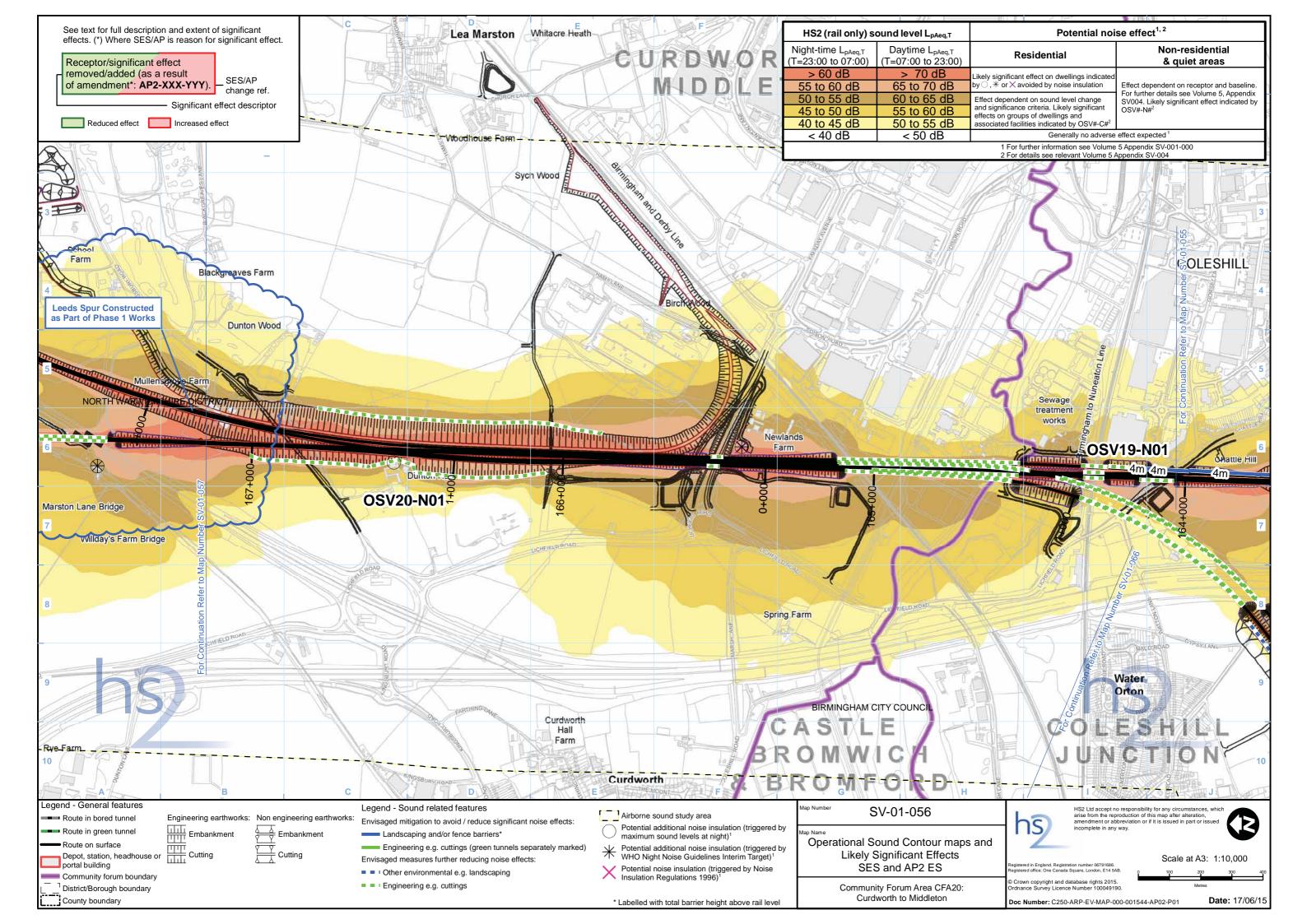
SV-02 – Operational Airborne Noise and Vibration Impacts and Likely Significant Effects (with Assessment Locations)

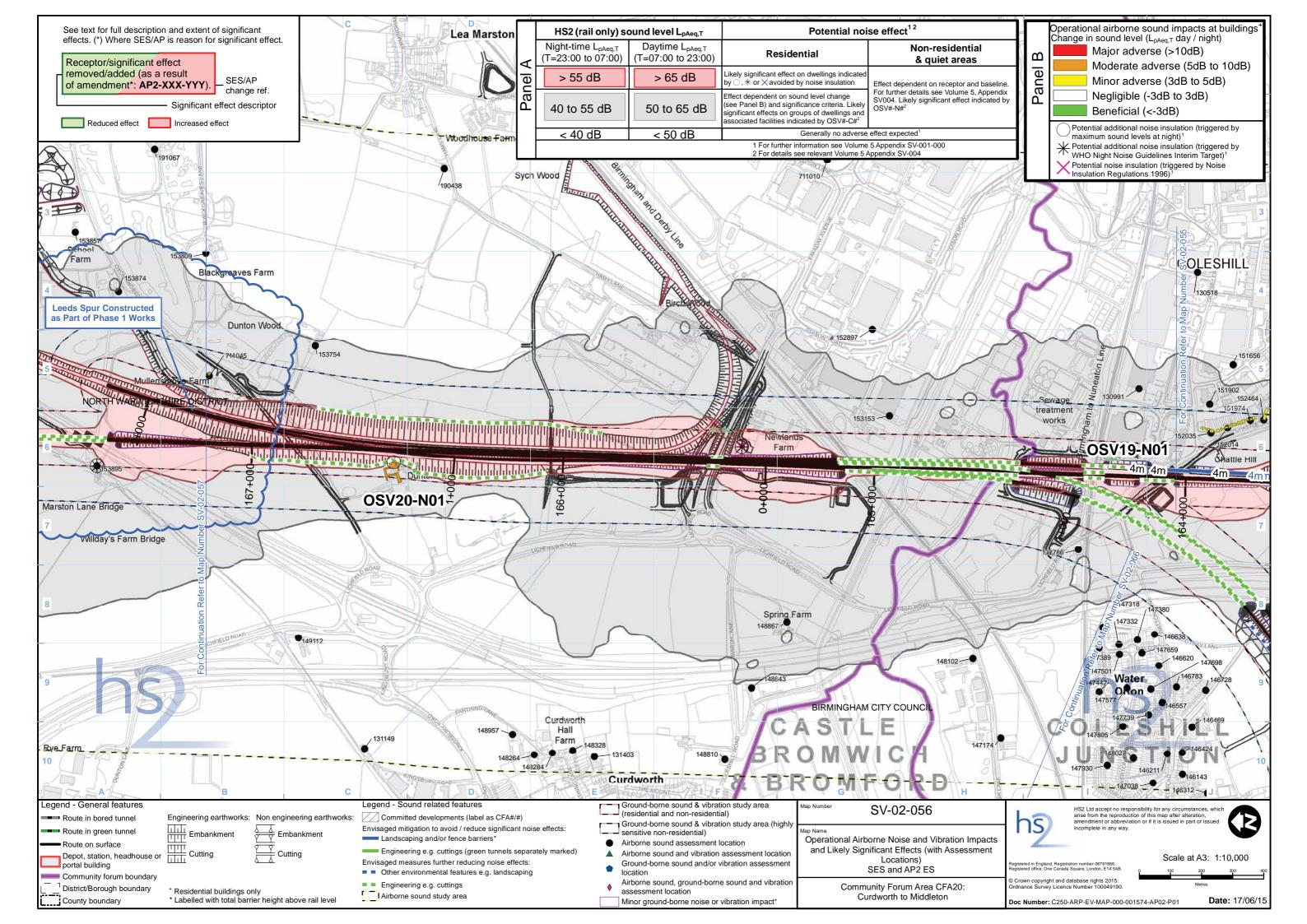
SV-03 – Assessment and Monitoring Locations for Construction Sound, Noise & Vibration Assessments

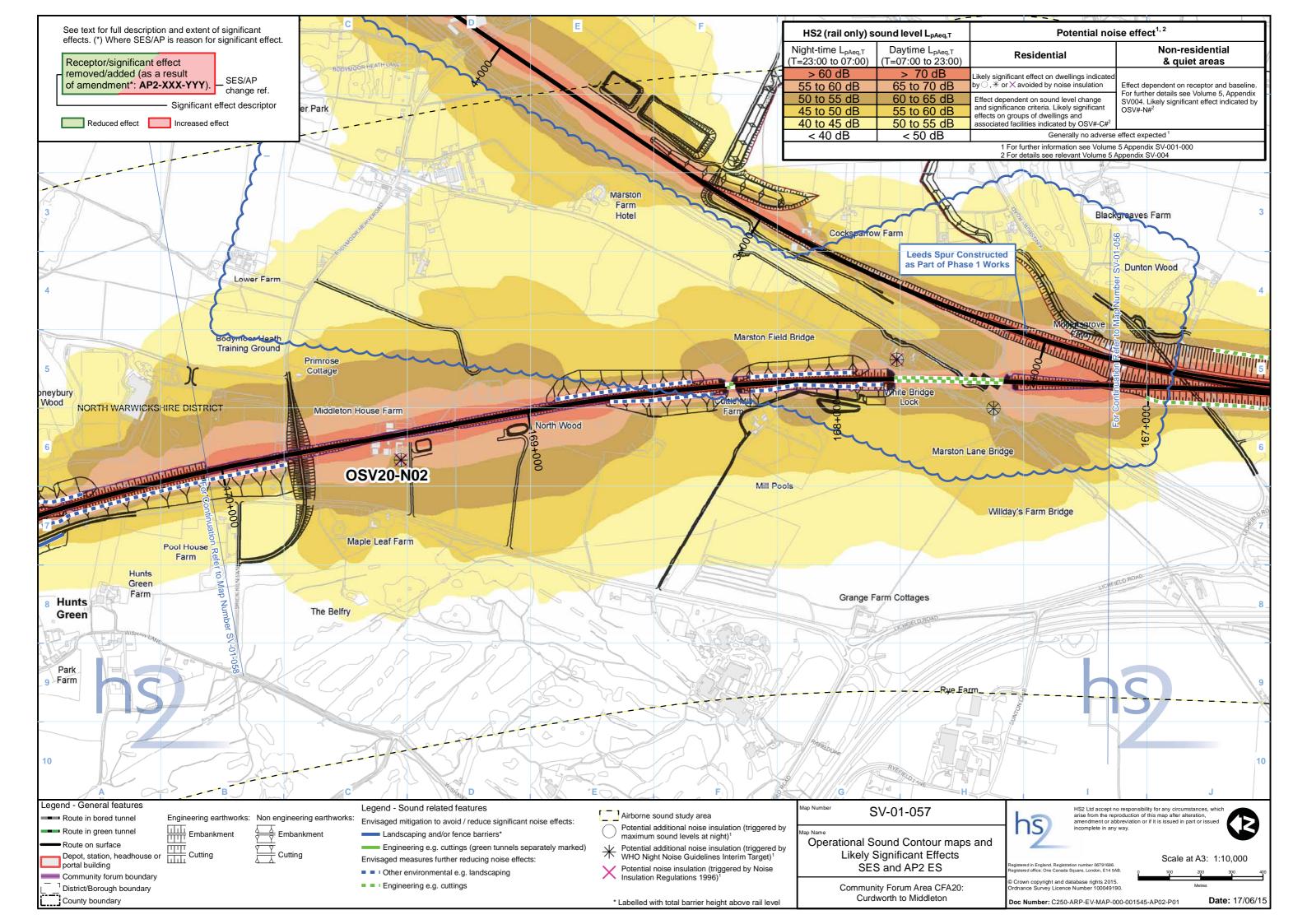
SV-04 – Assessment and Monitoring Locations for Operational Sound, Noise & Vibration Assessments

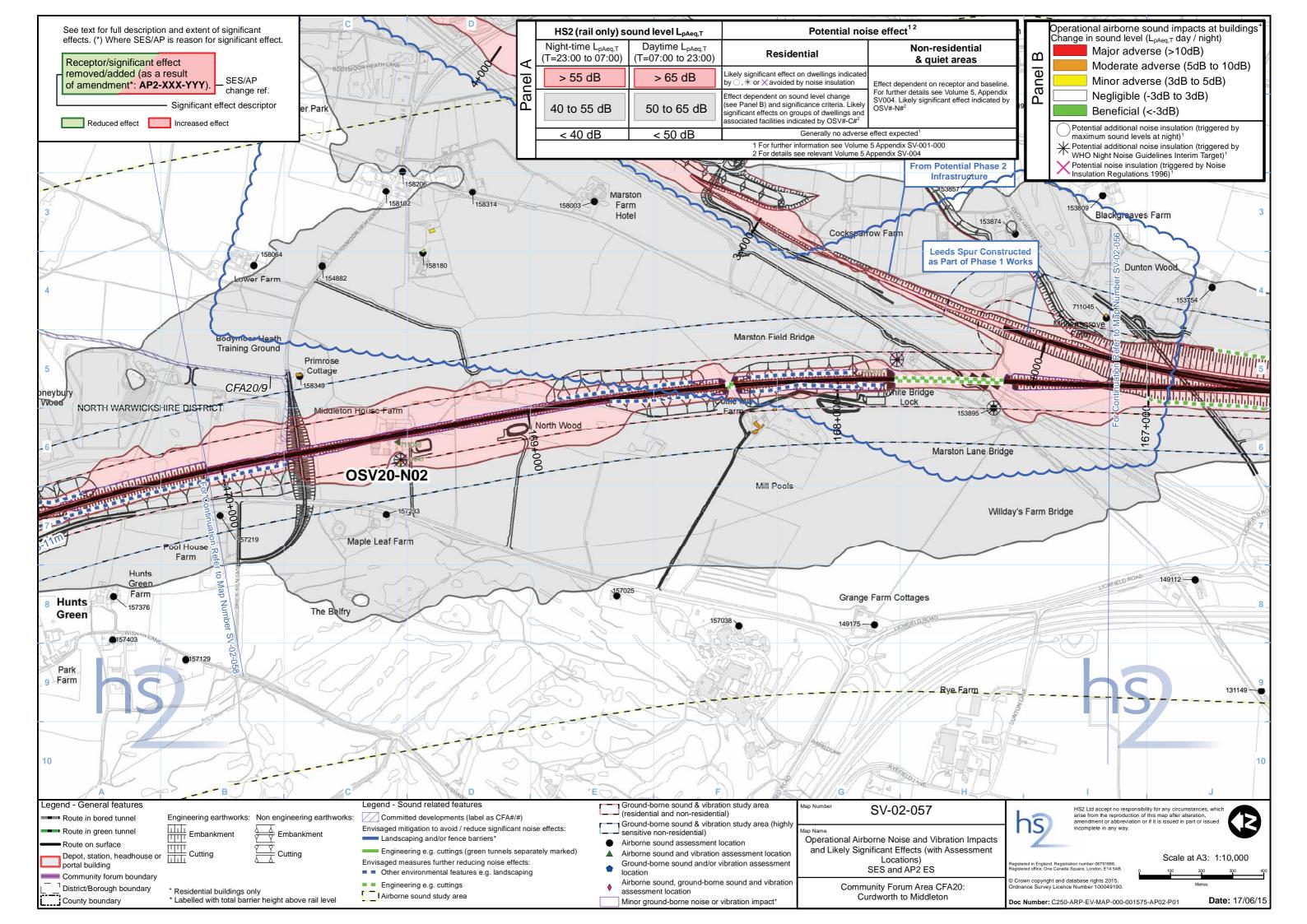


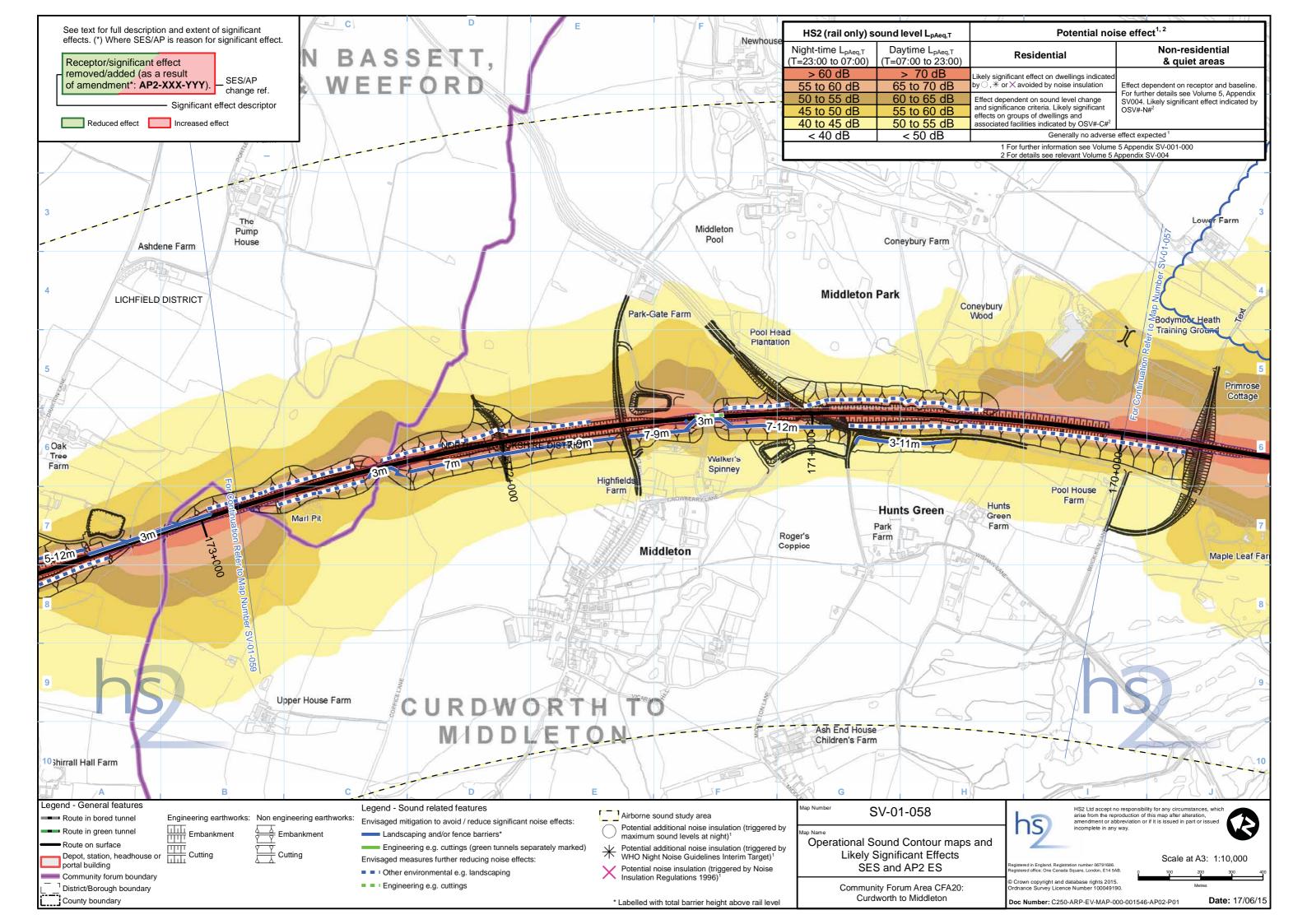


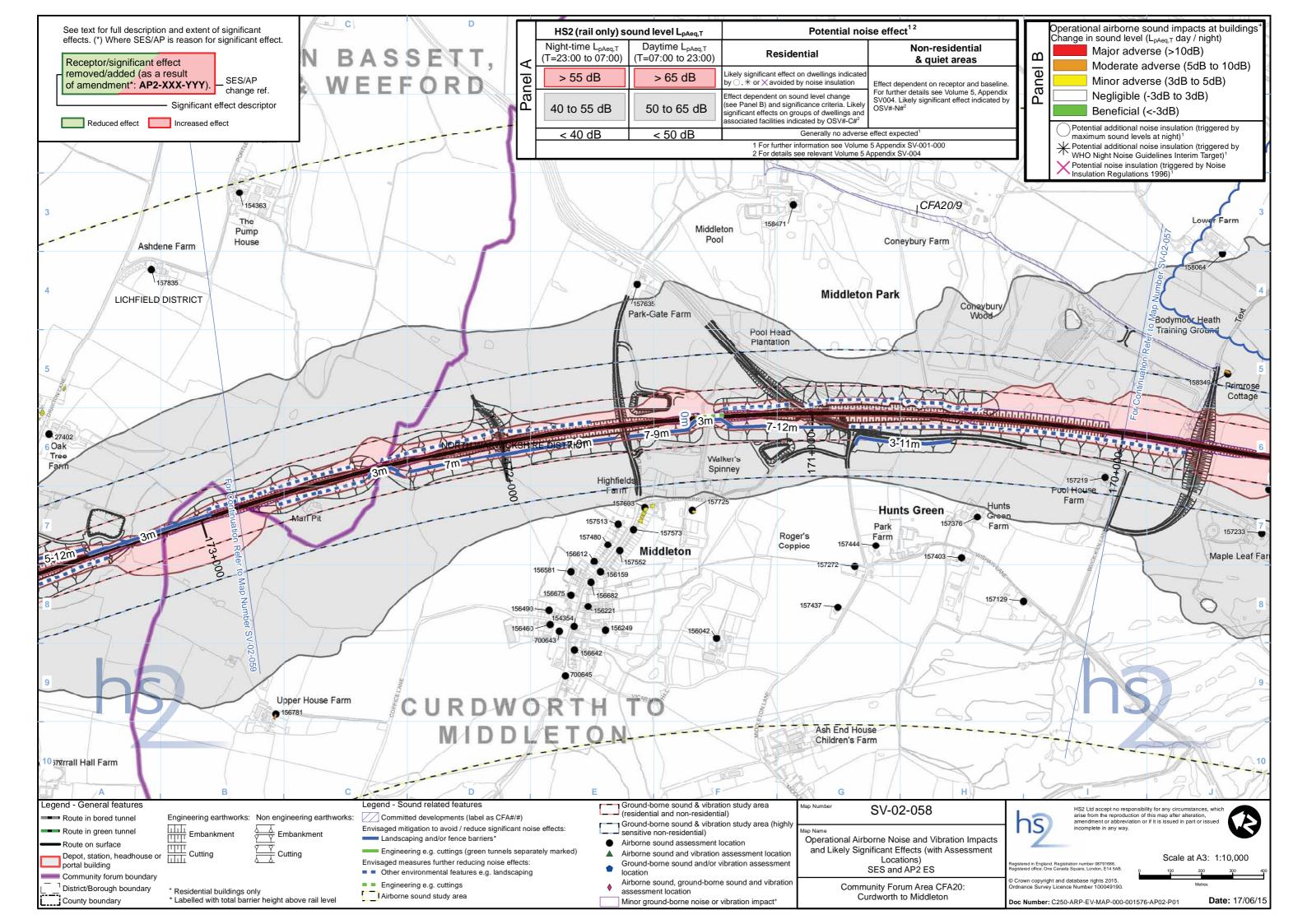


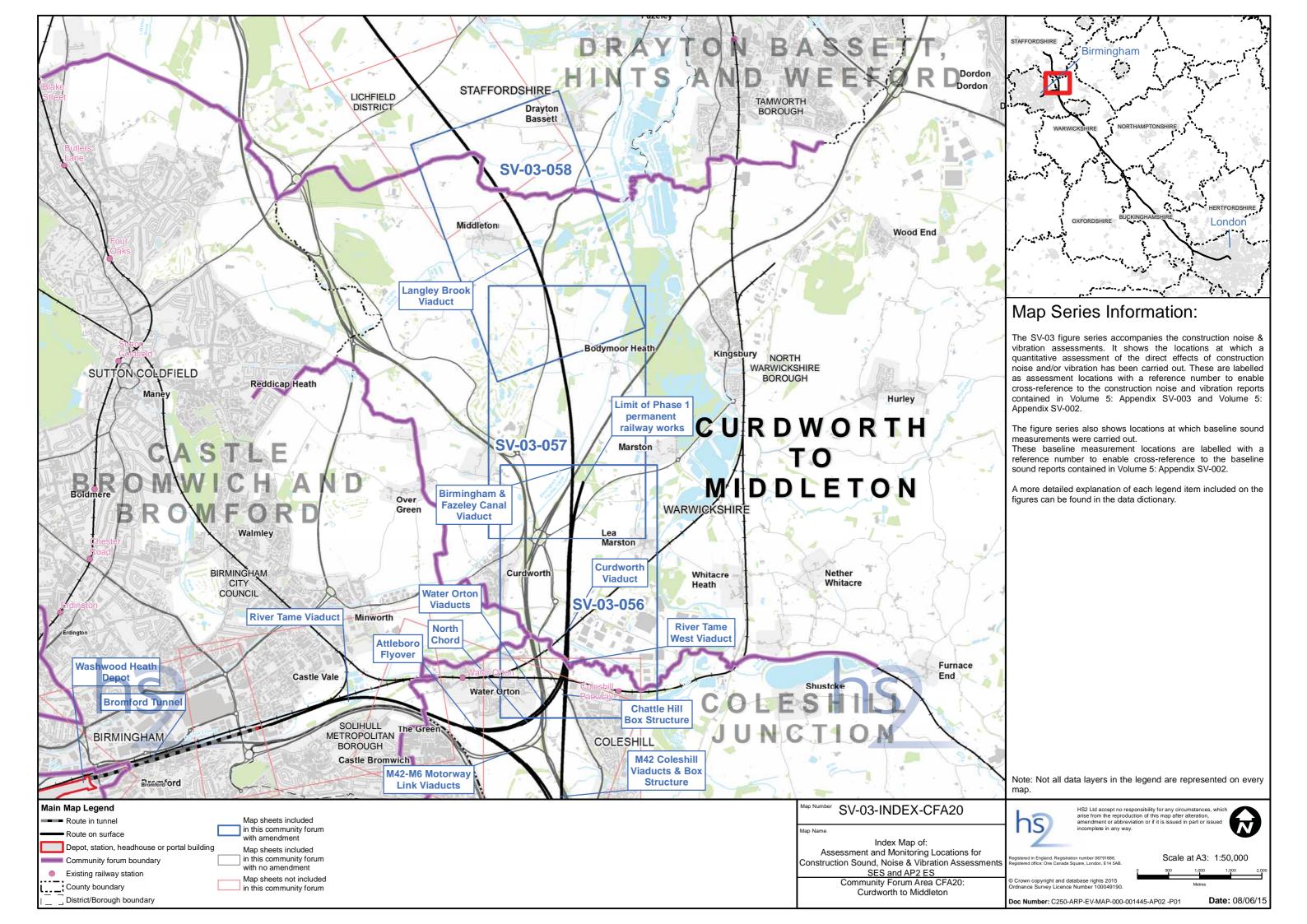


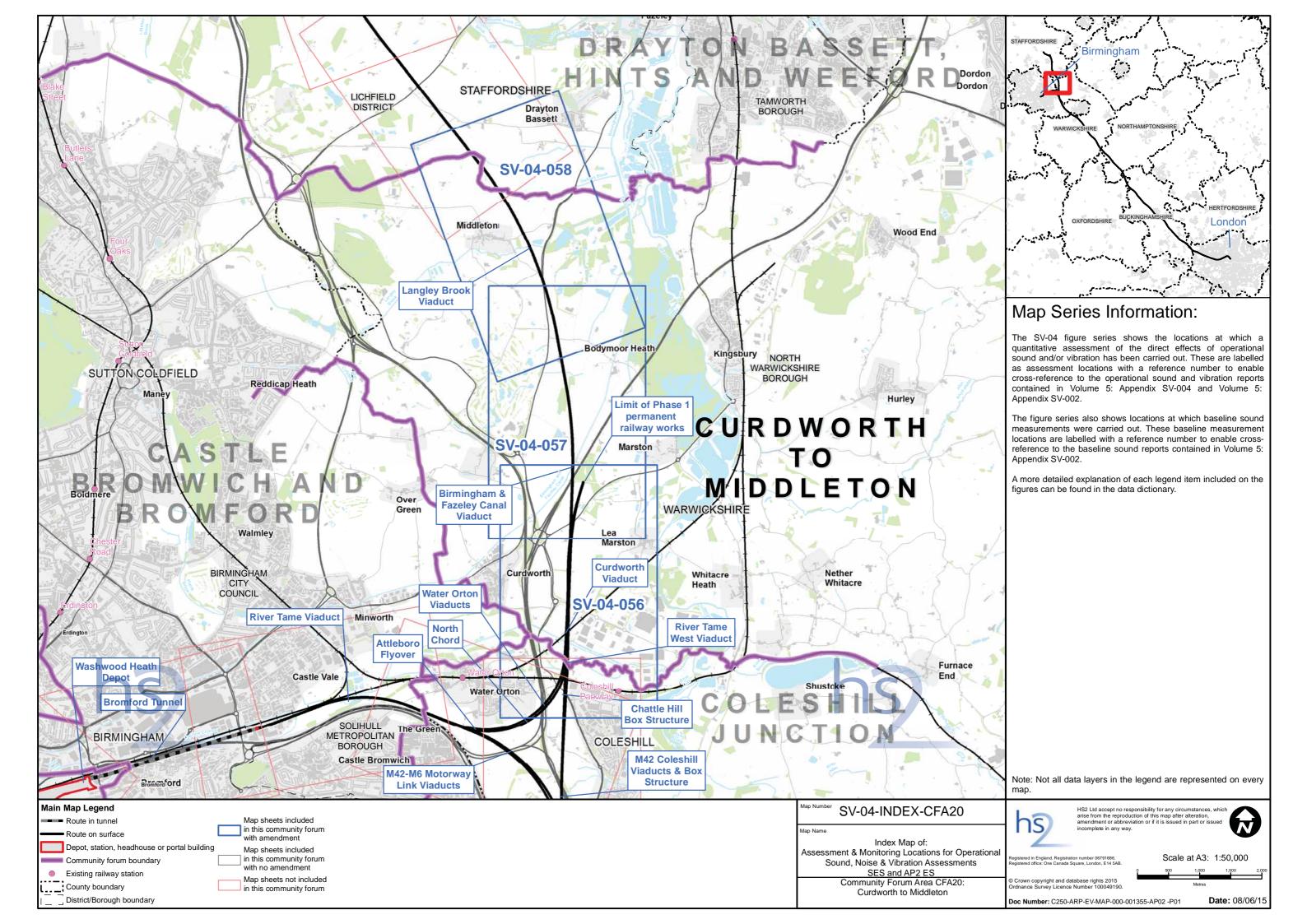


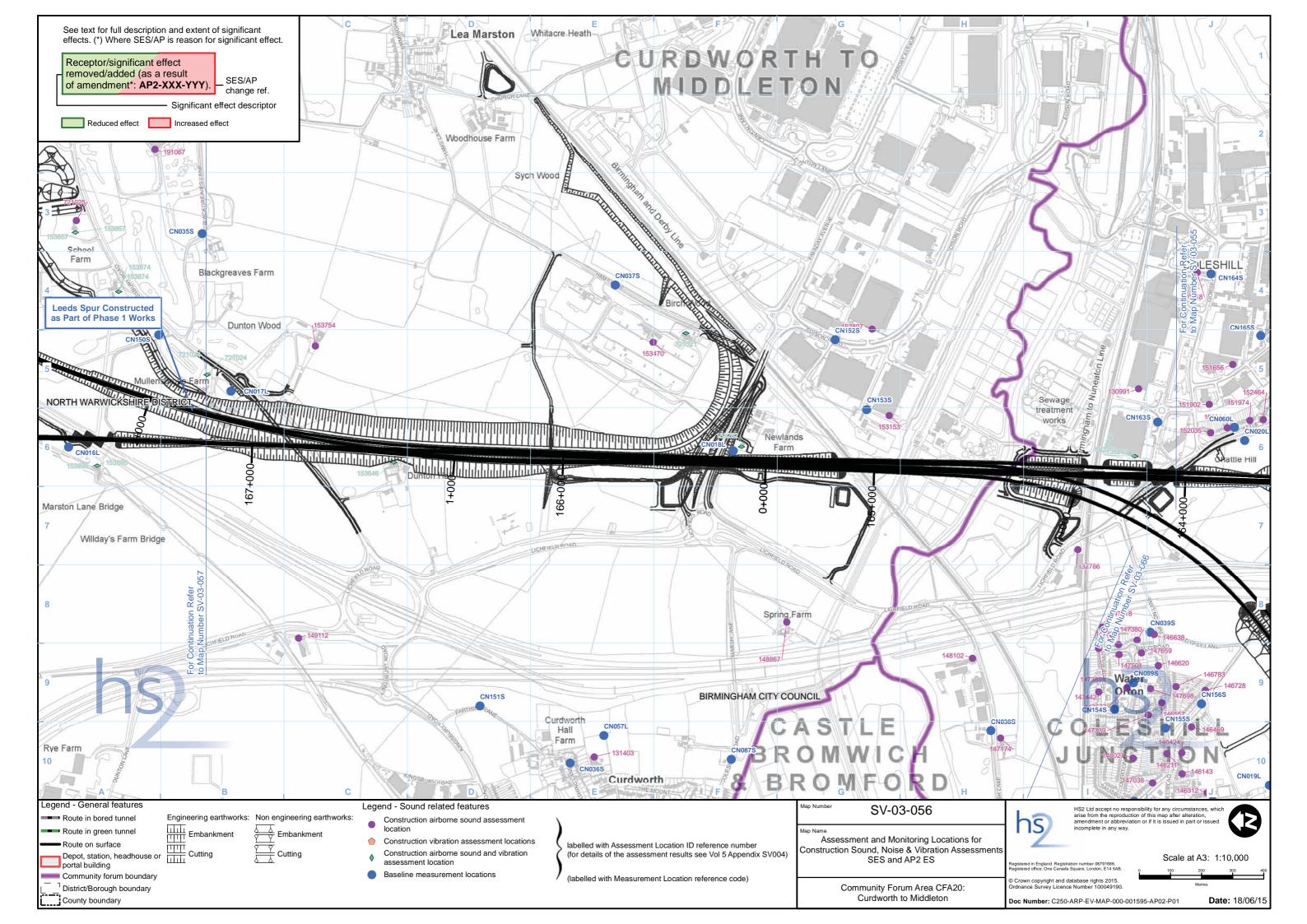


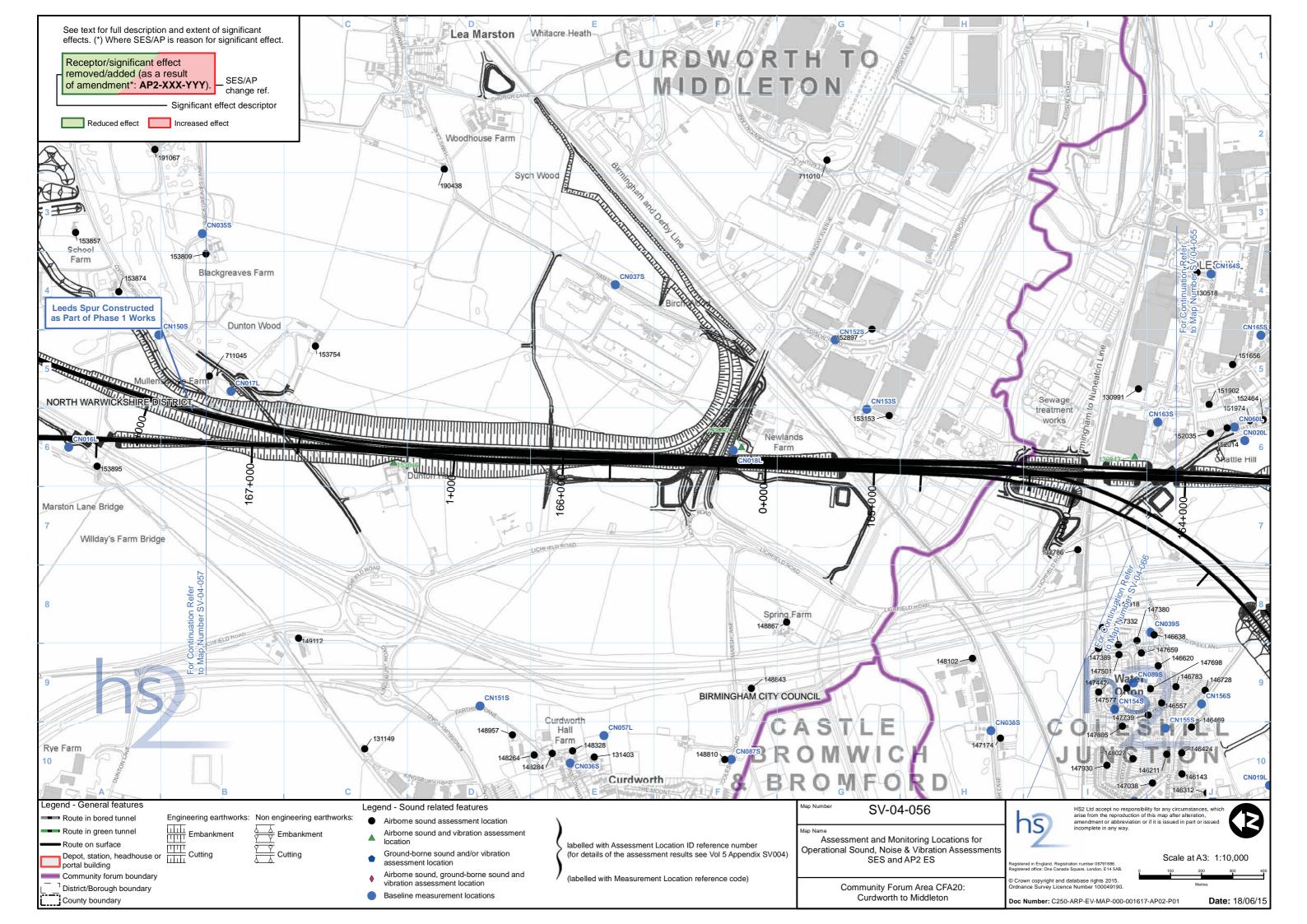


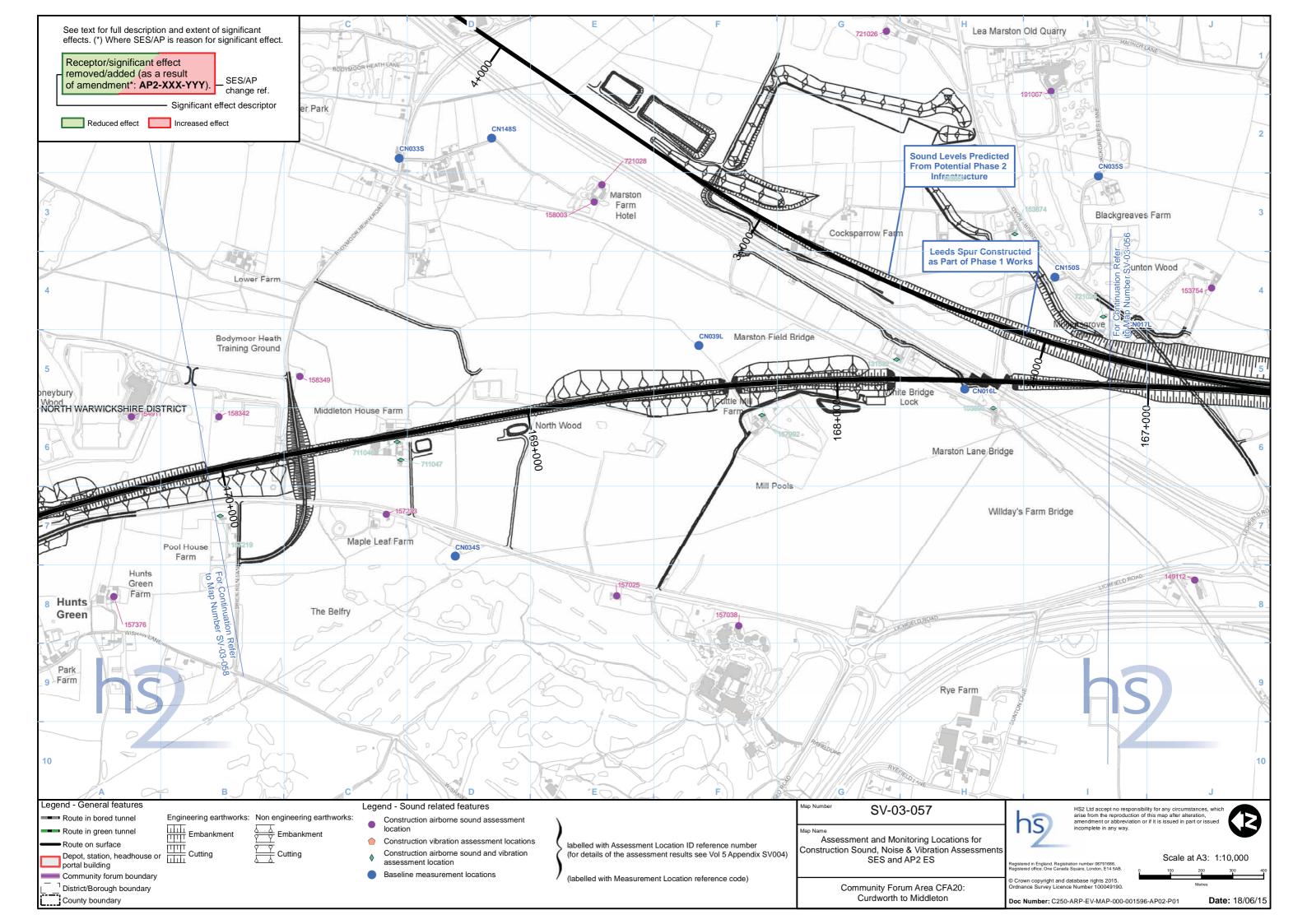


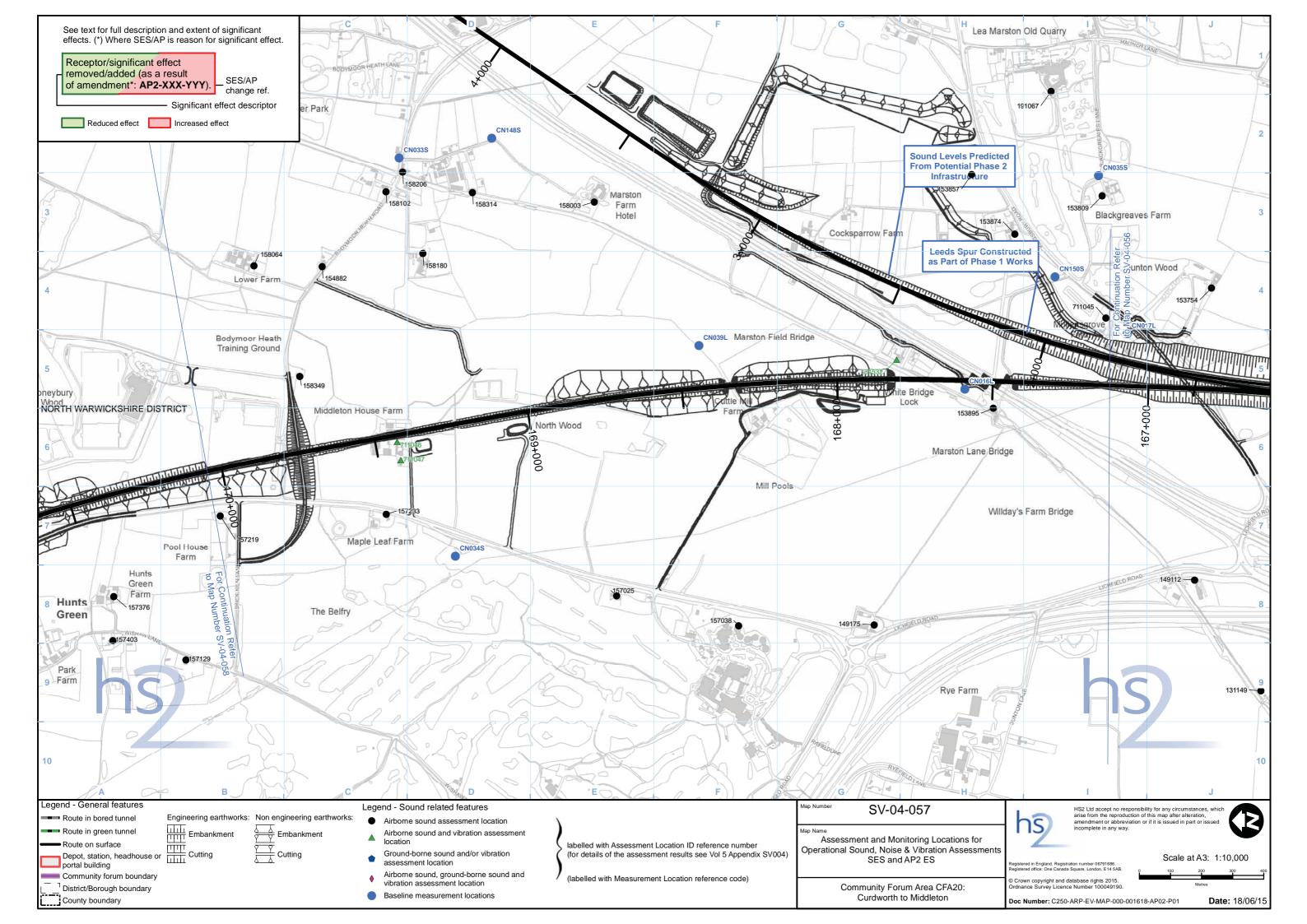


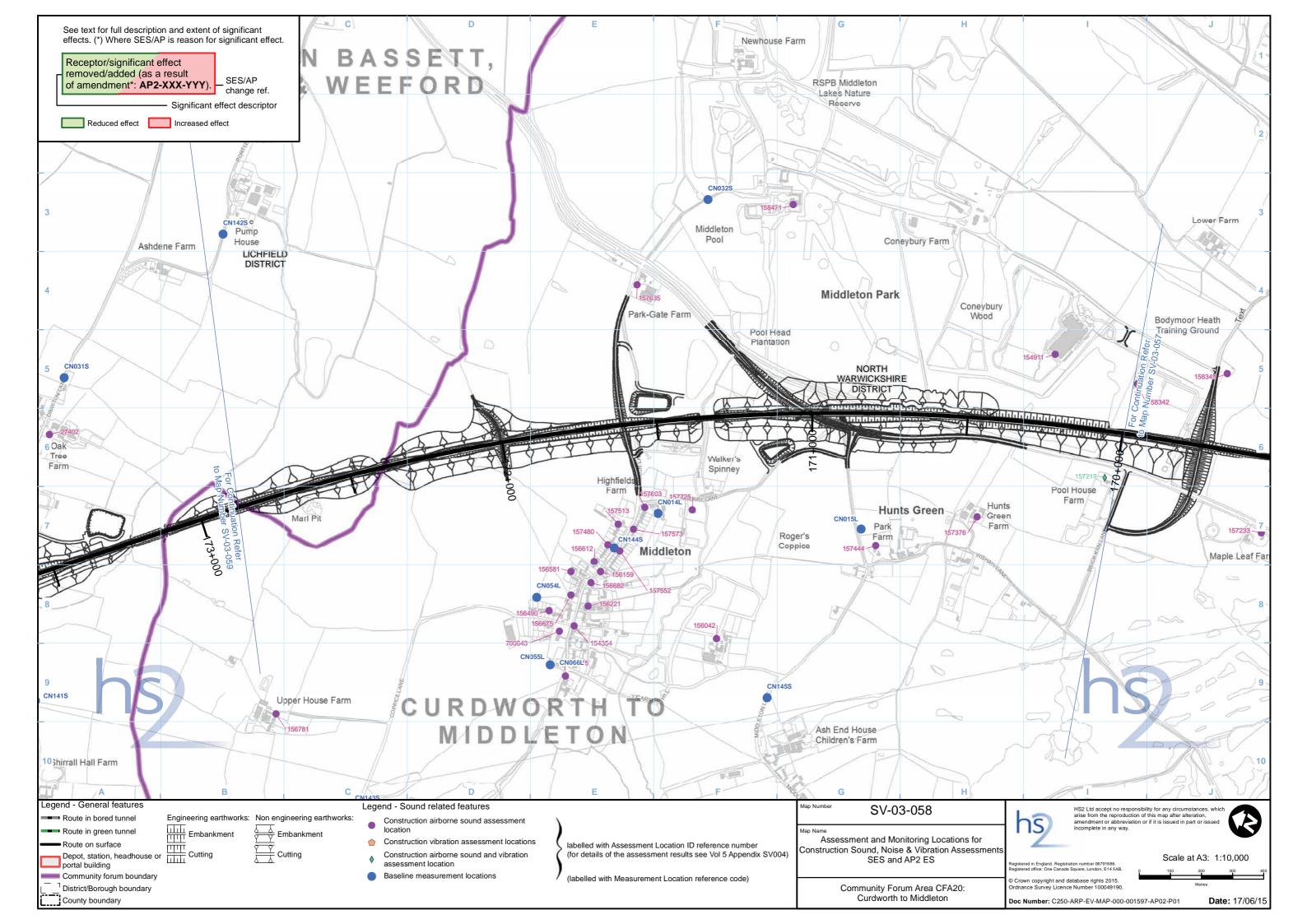


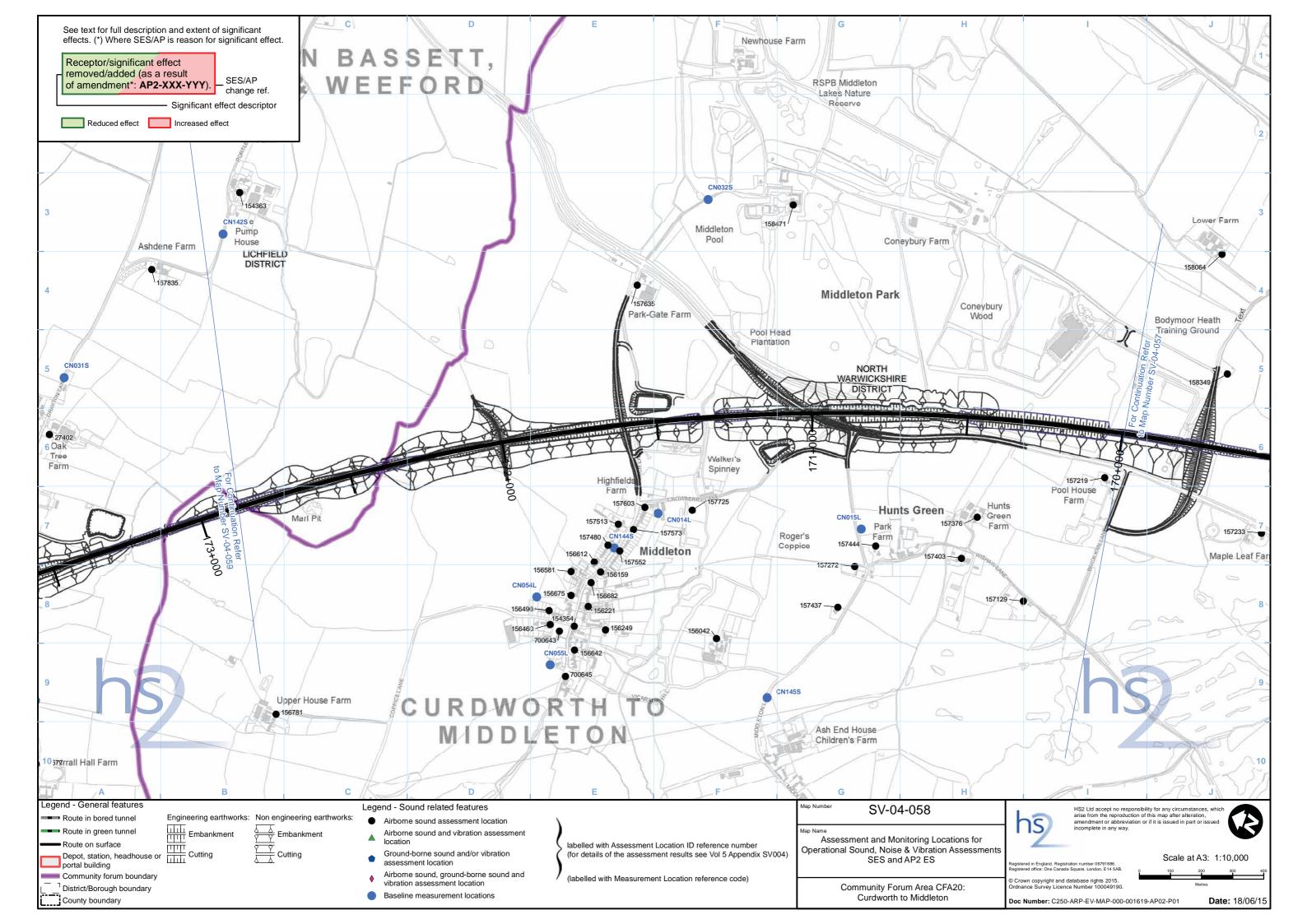


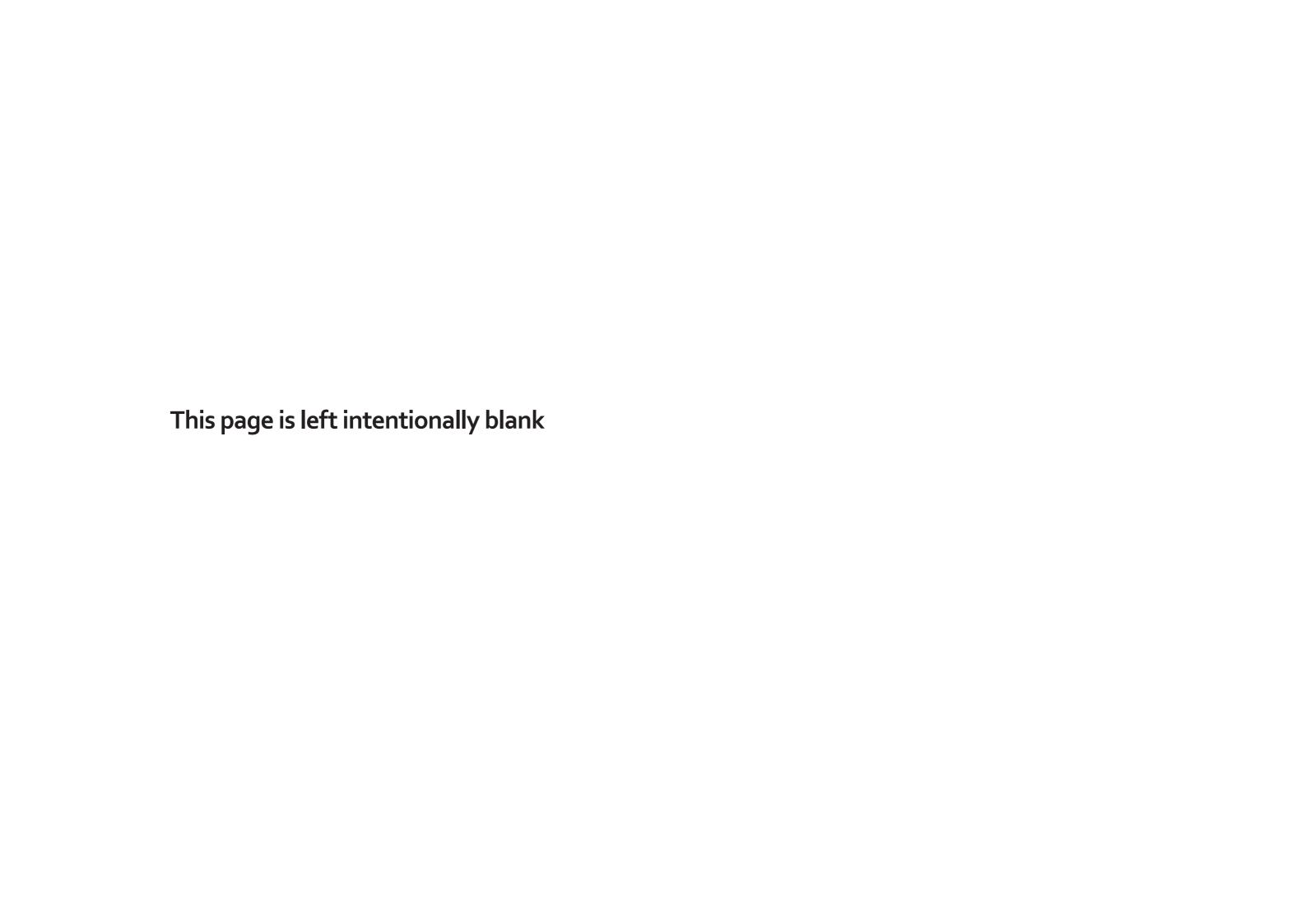












## HIGH SPEED RAIL (LONDON - WEST MIDLANDS)

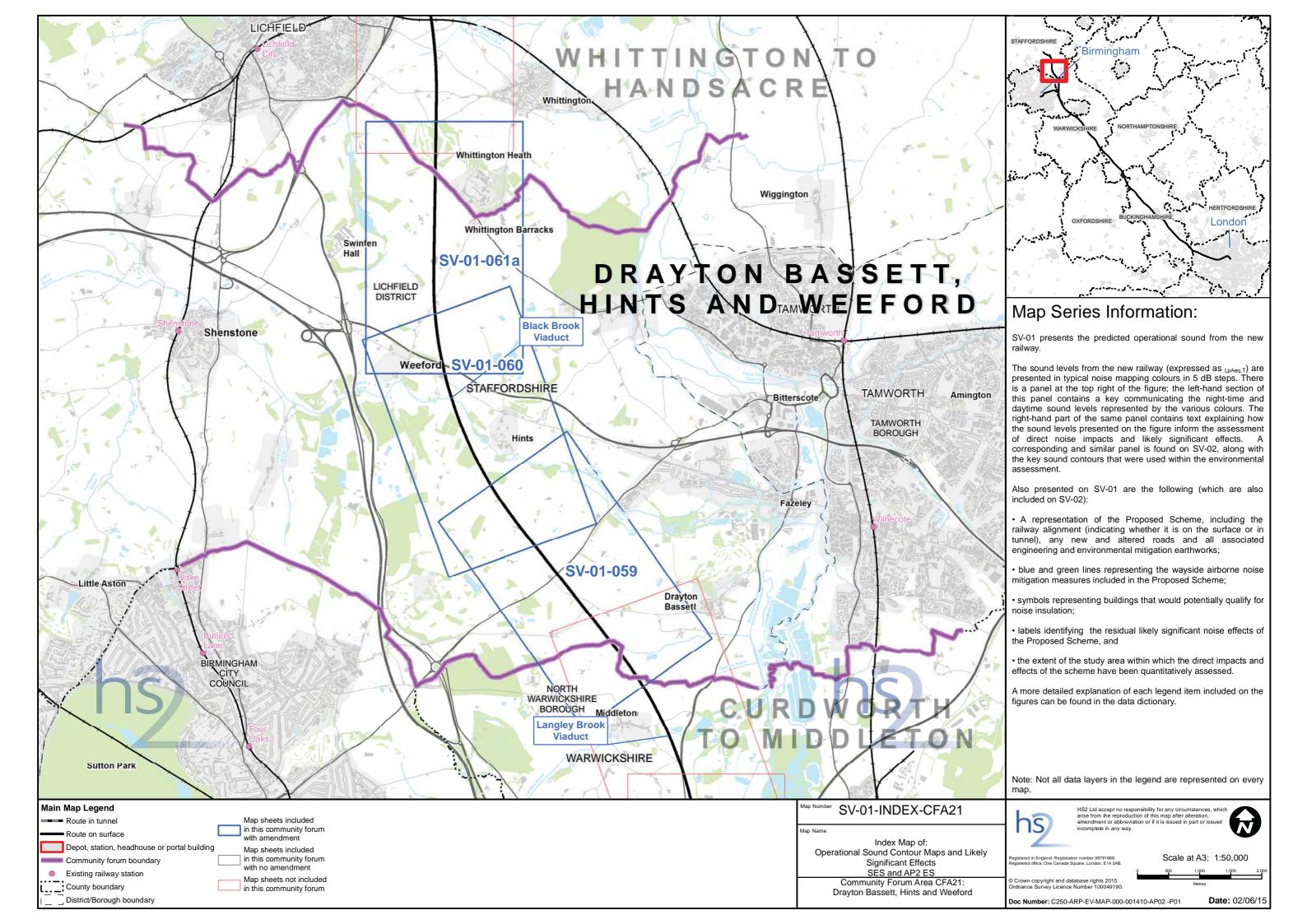
Supplementary Environmental Statement and Additional Provision 2 Environmental Statement

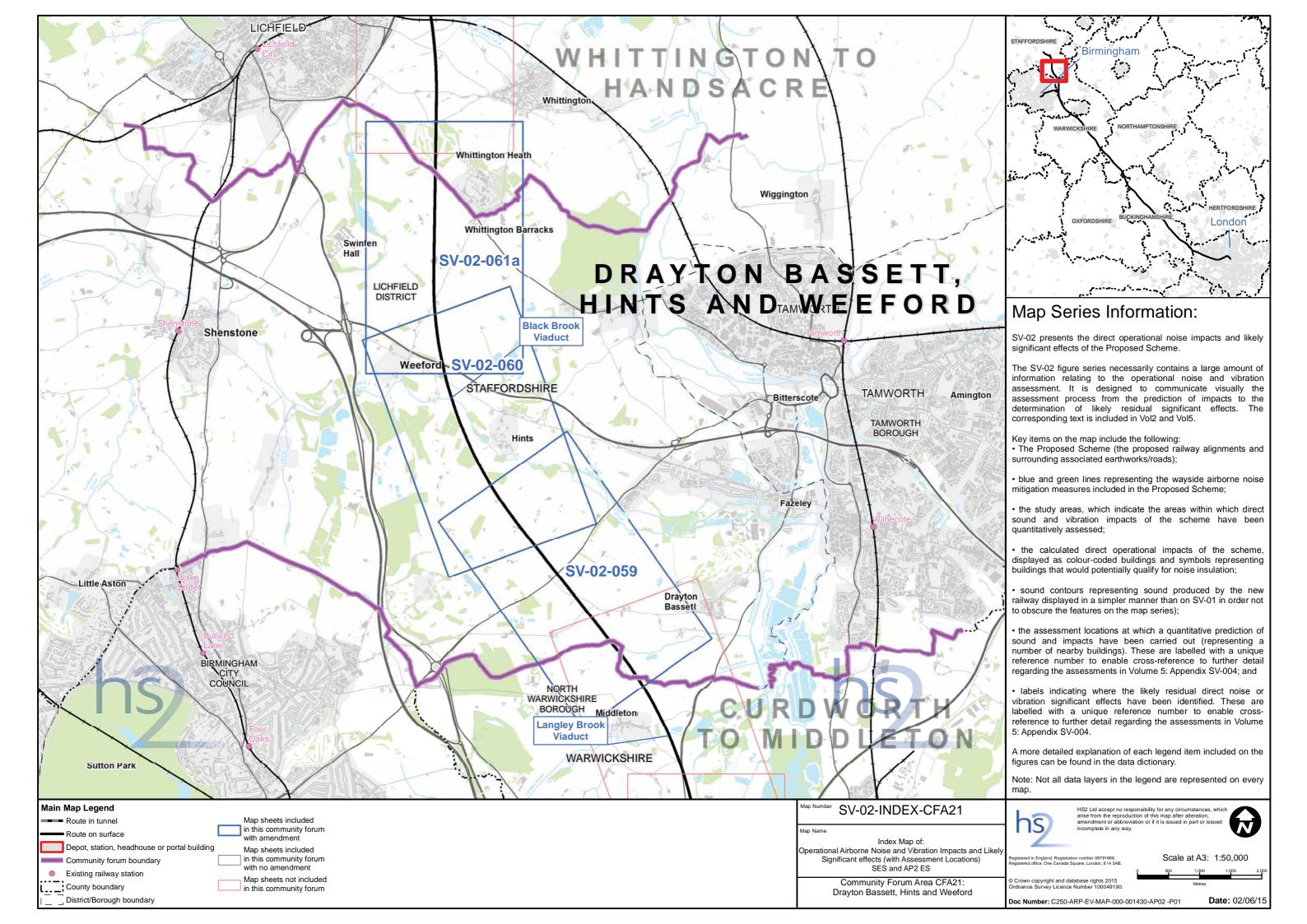
Volume 5 | CFA21 | Drayton Bassett, Hints and Weeford

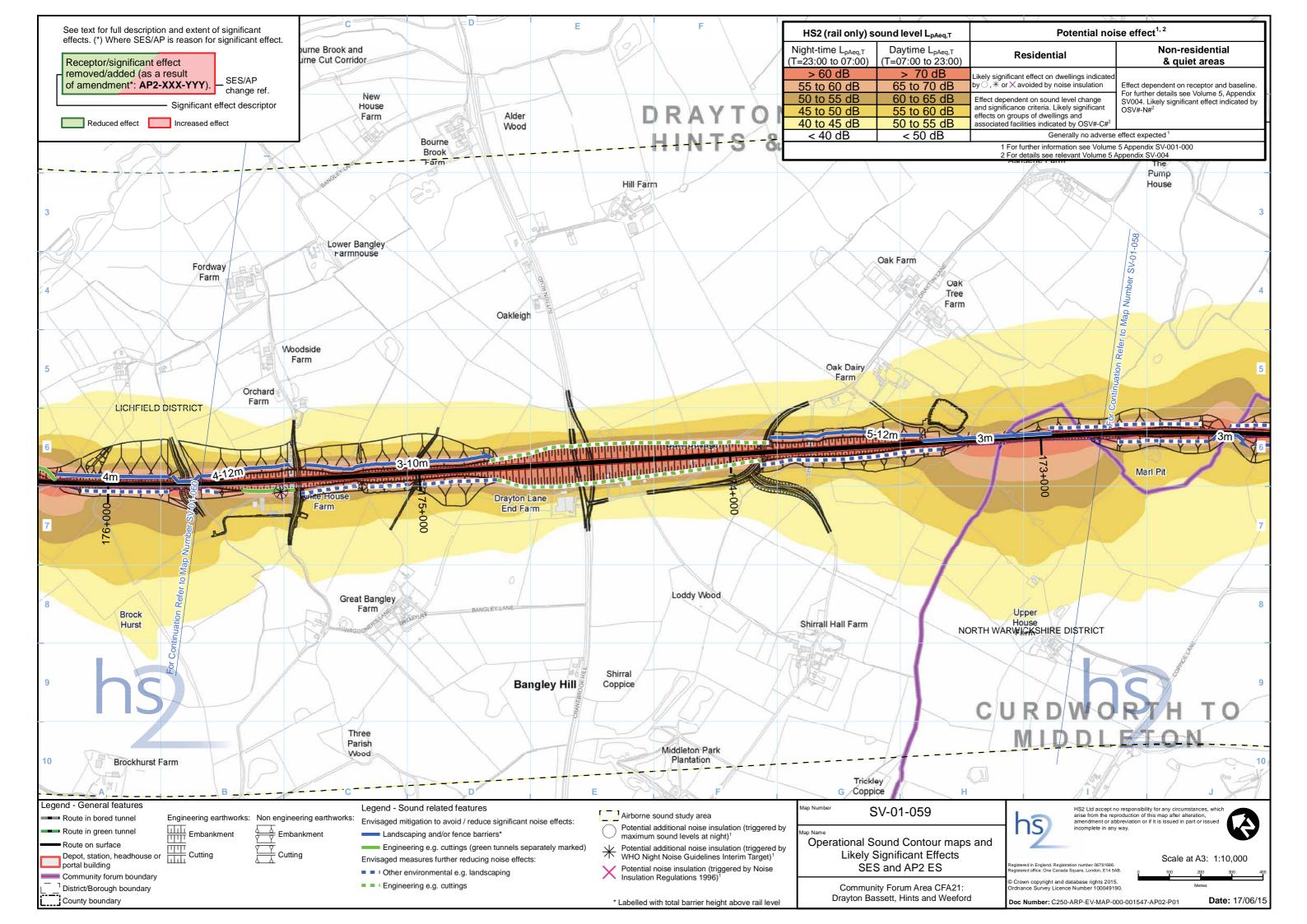
SV-01 – Operational Sound Contour Maps and Likely Significant Effects

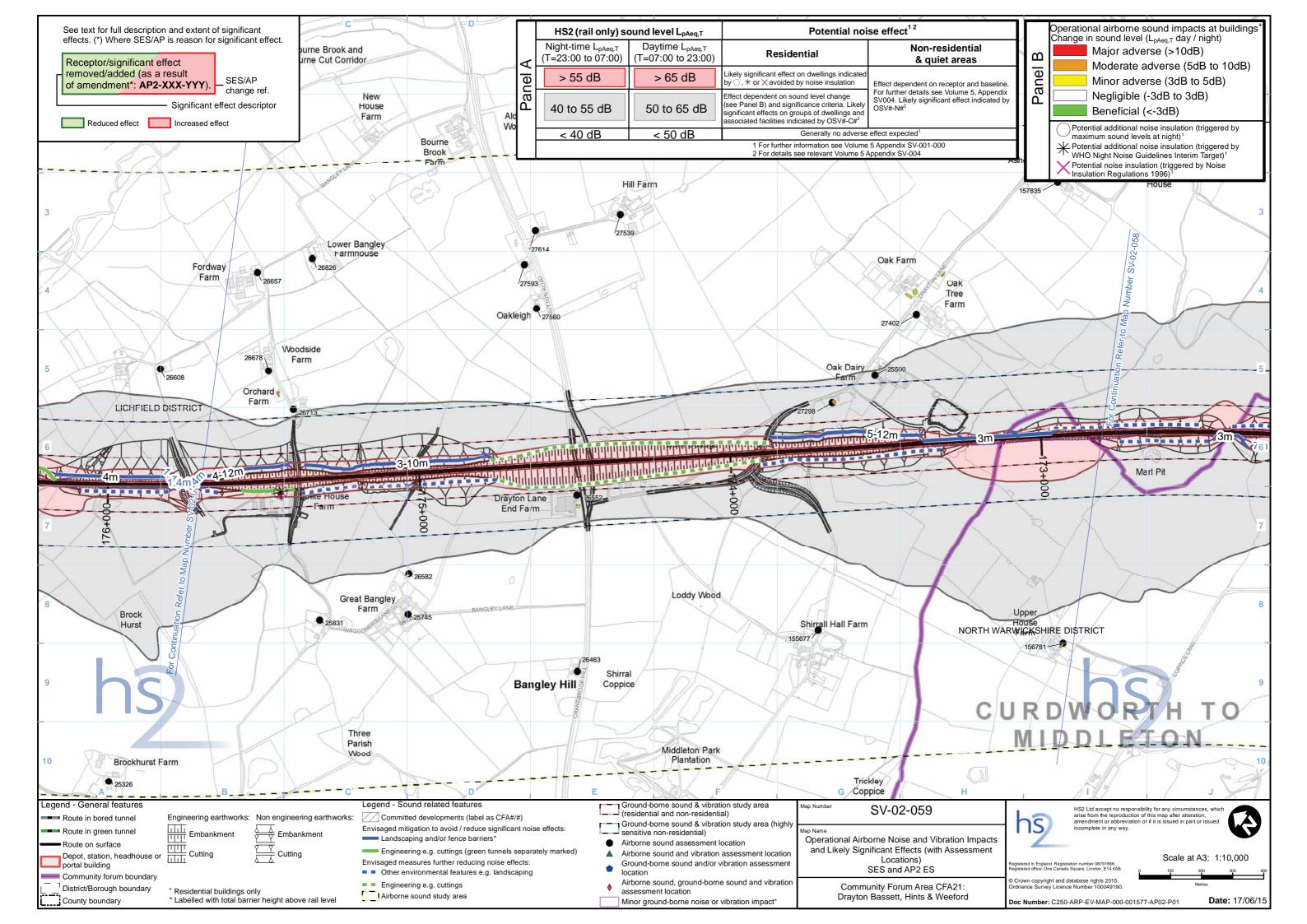
SV-02 – Operational Airborne Noise and Vibration Impacts and Likely Significant Effects (with Assessment Locations)

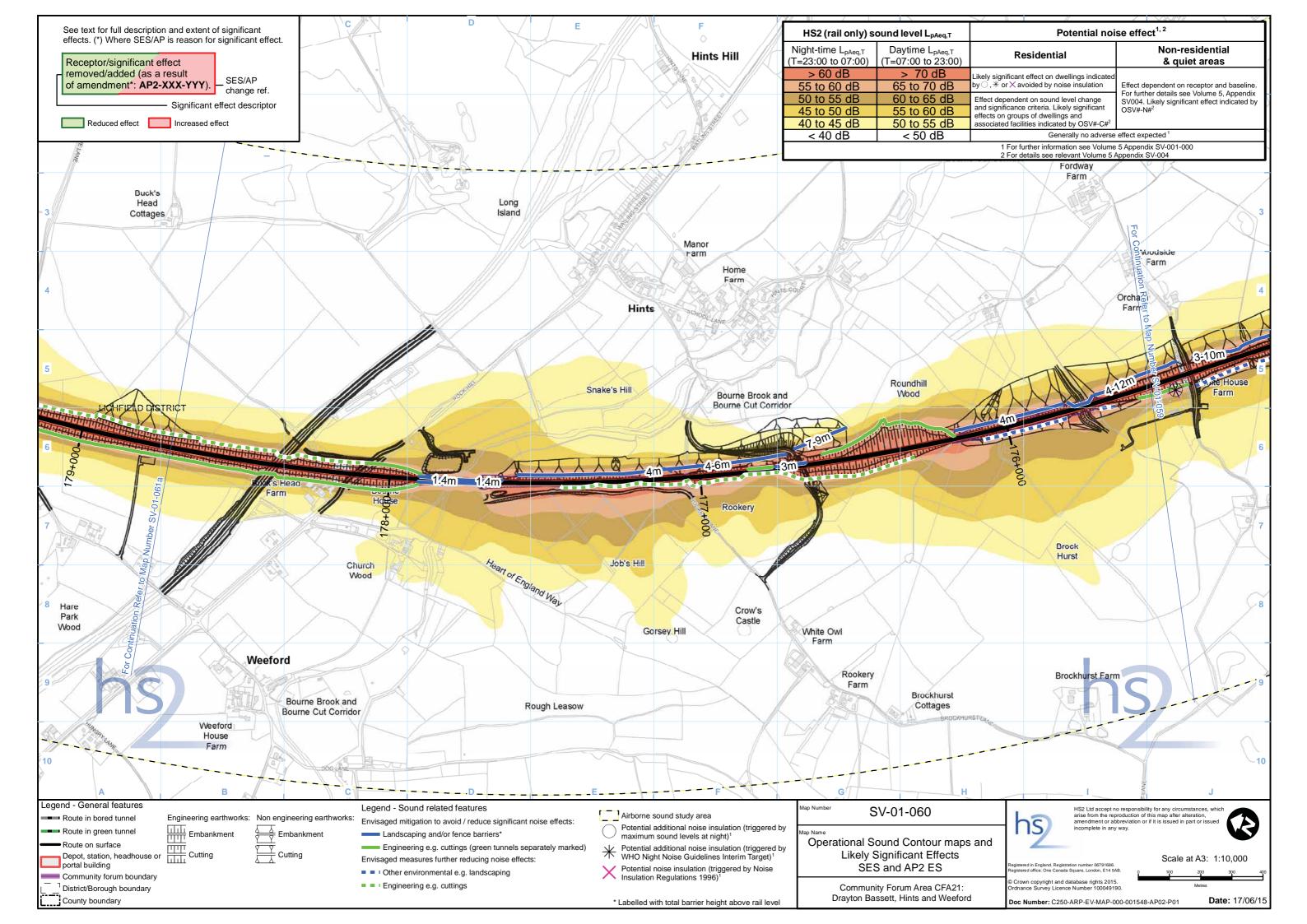
SV-03 – Assessment and Monitoring Locations for Construction Sound, Noise & Vibration Assessments

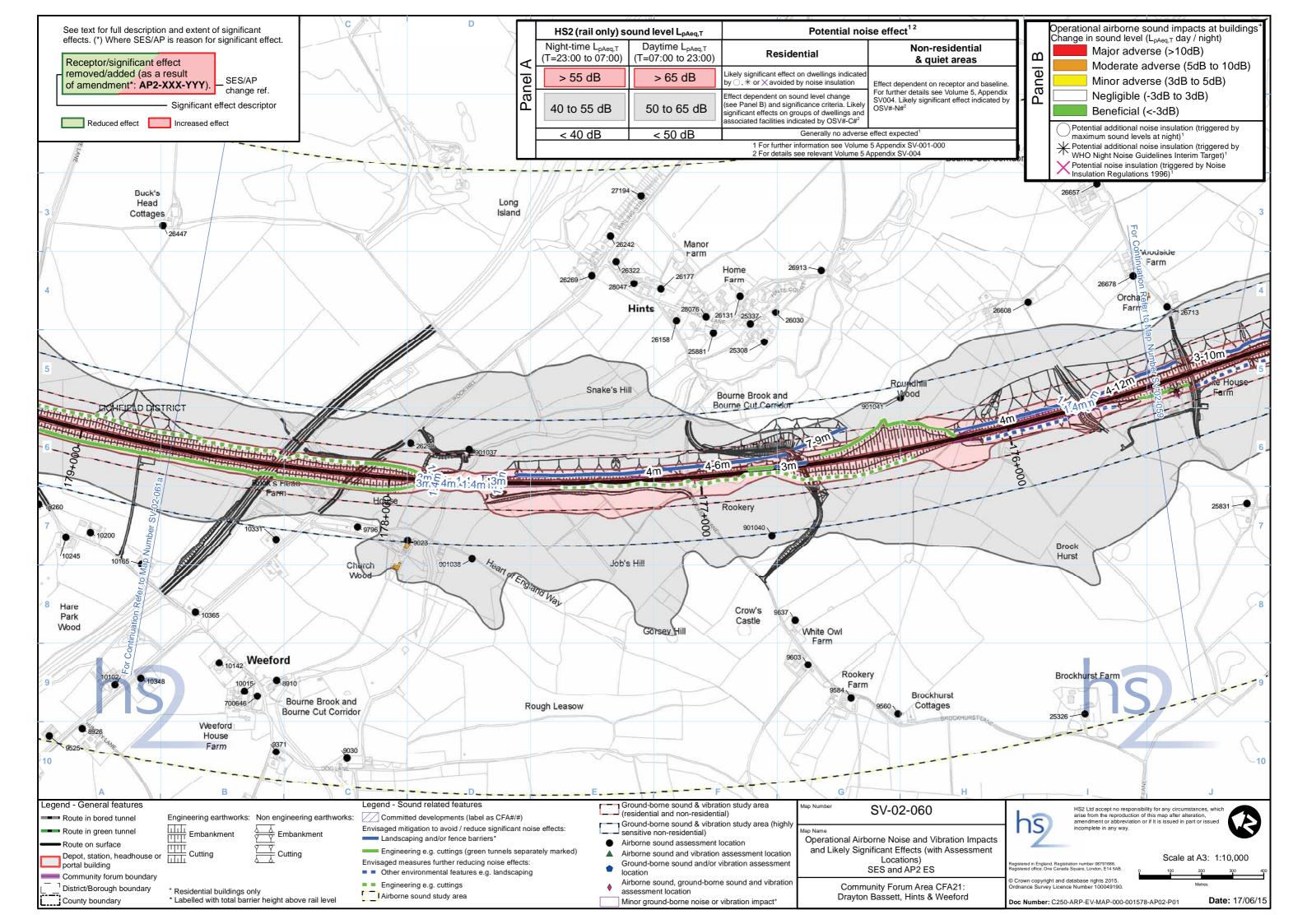


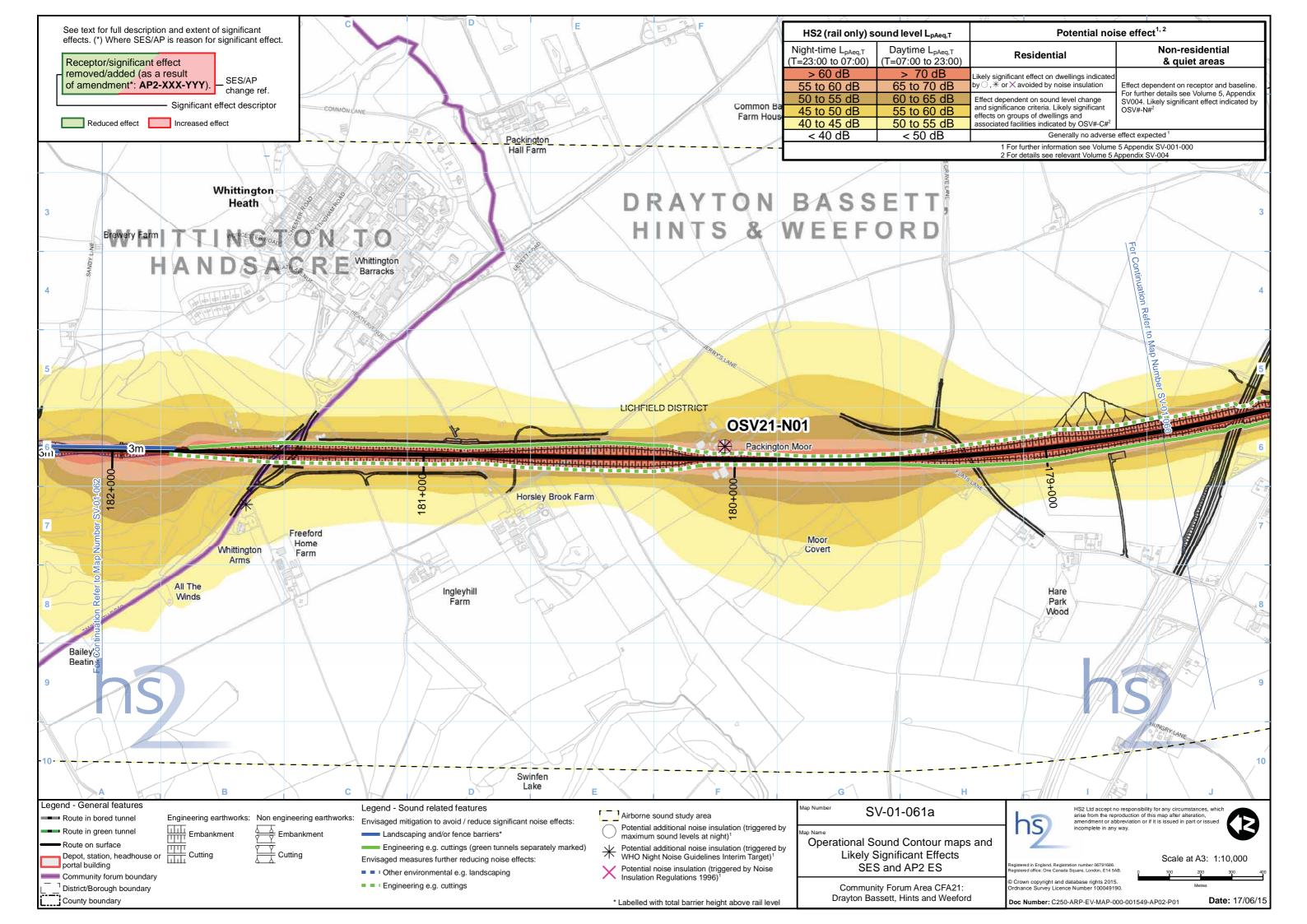


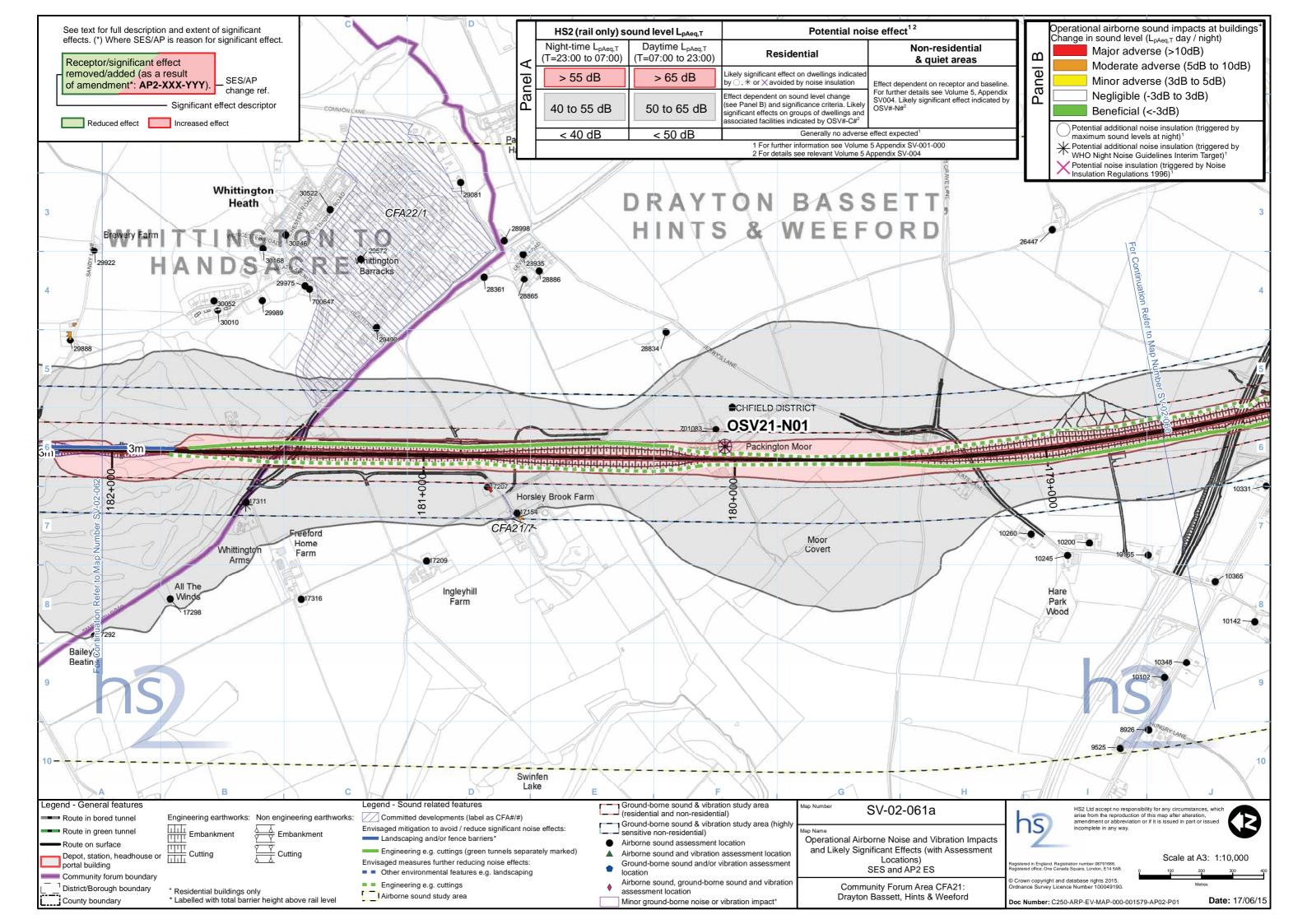


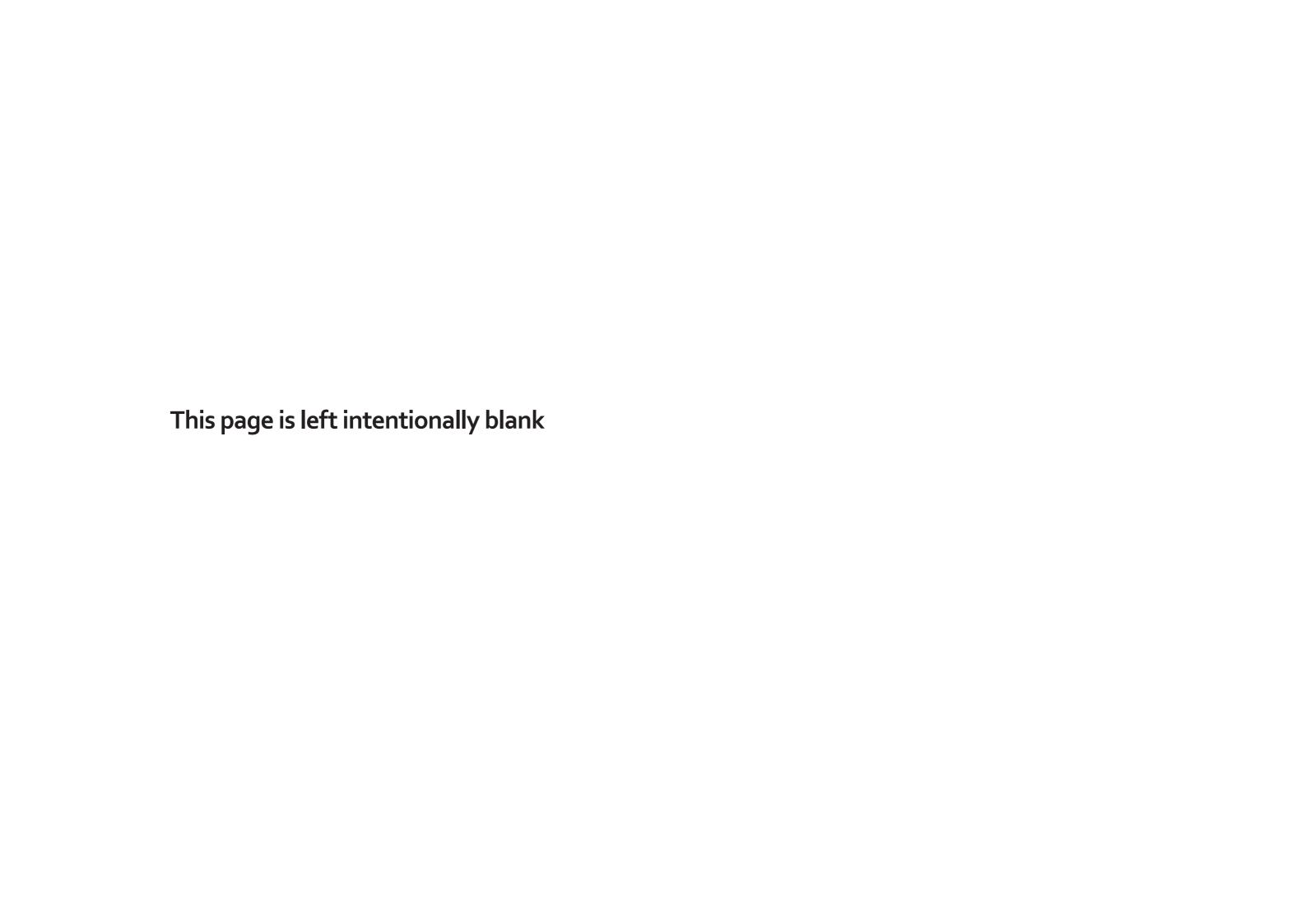


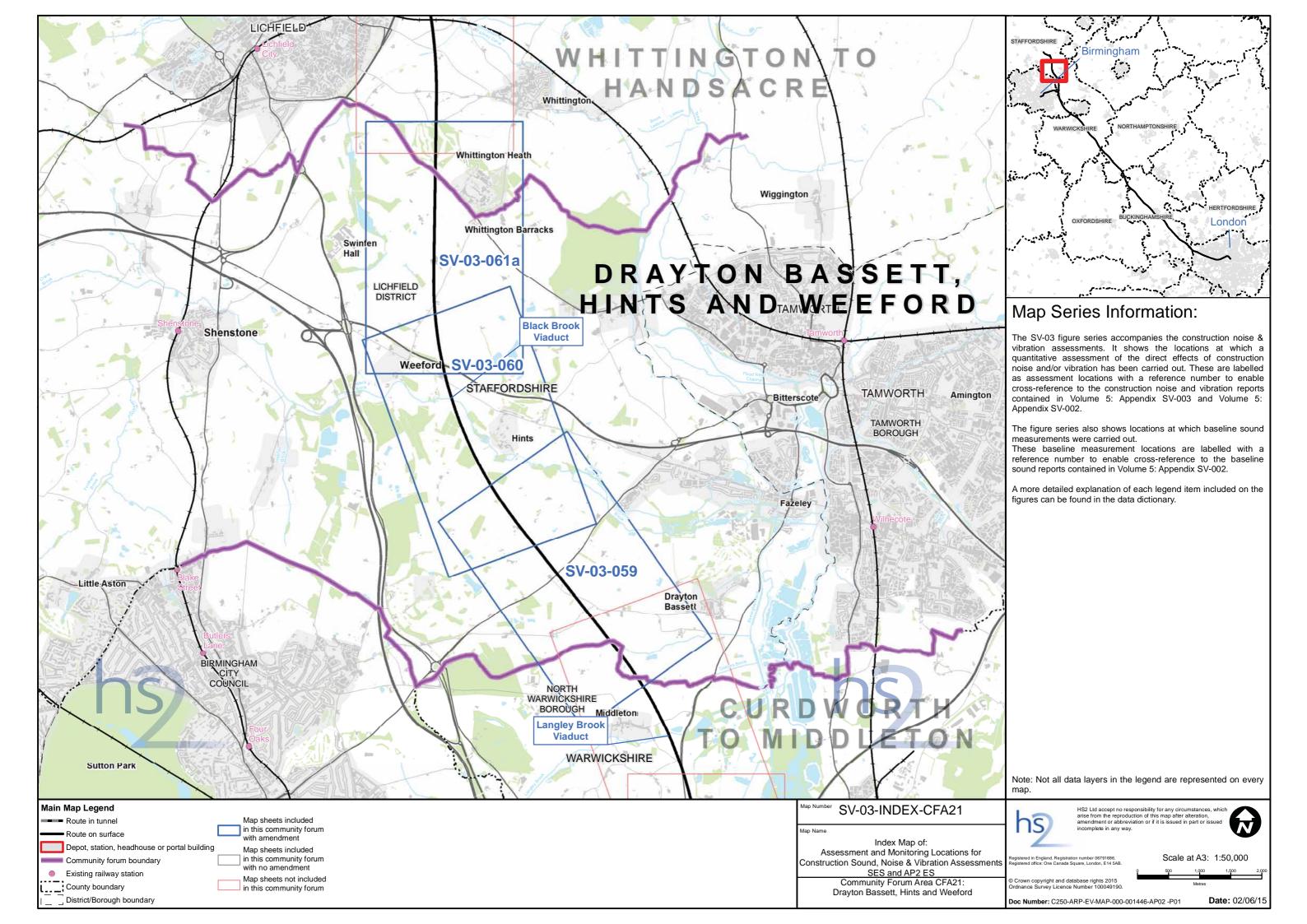


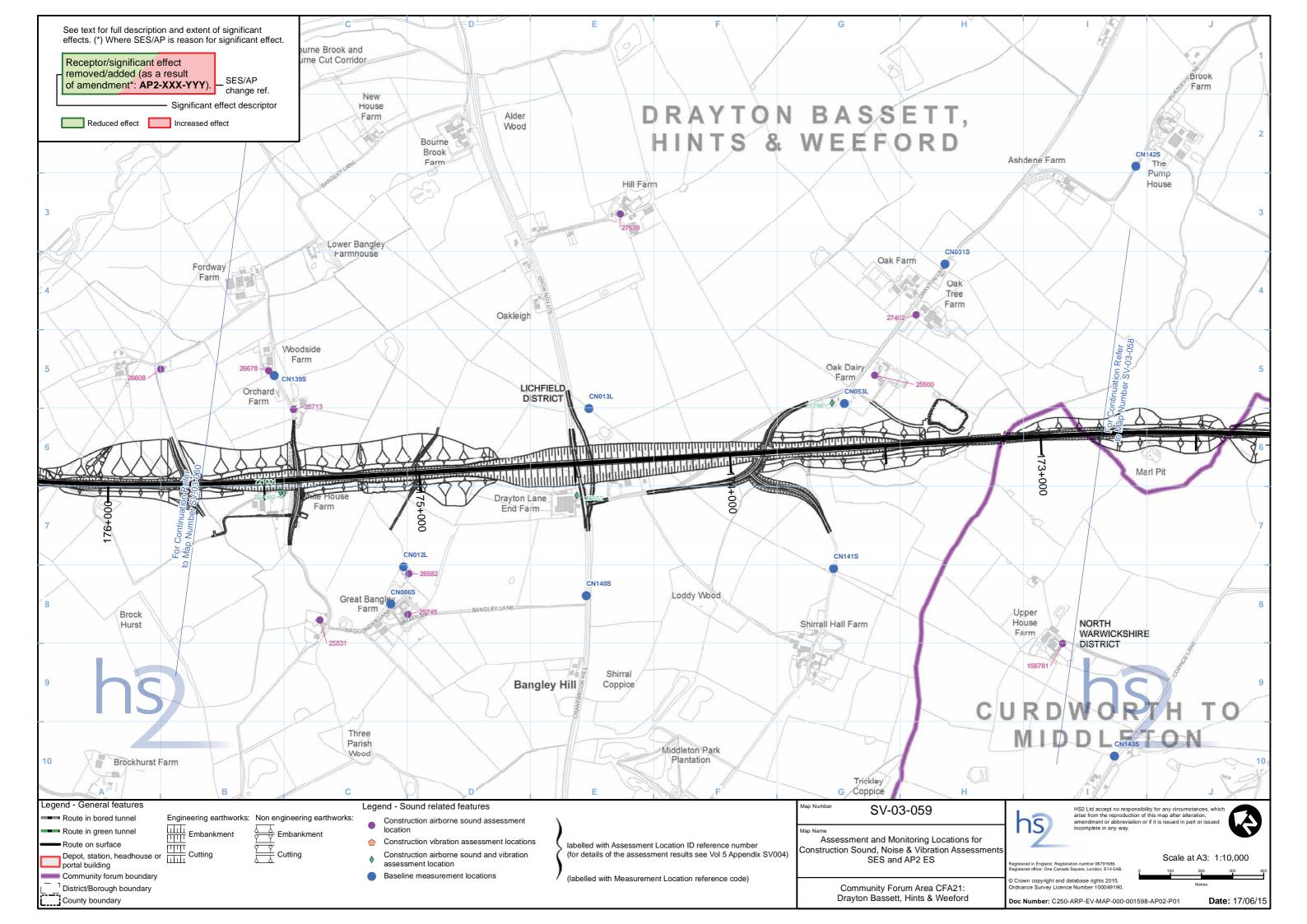


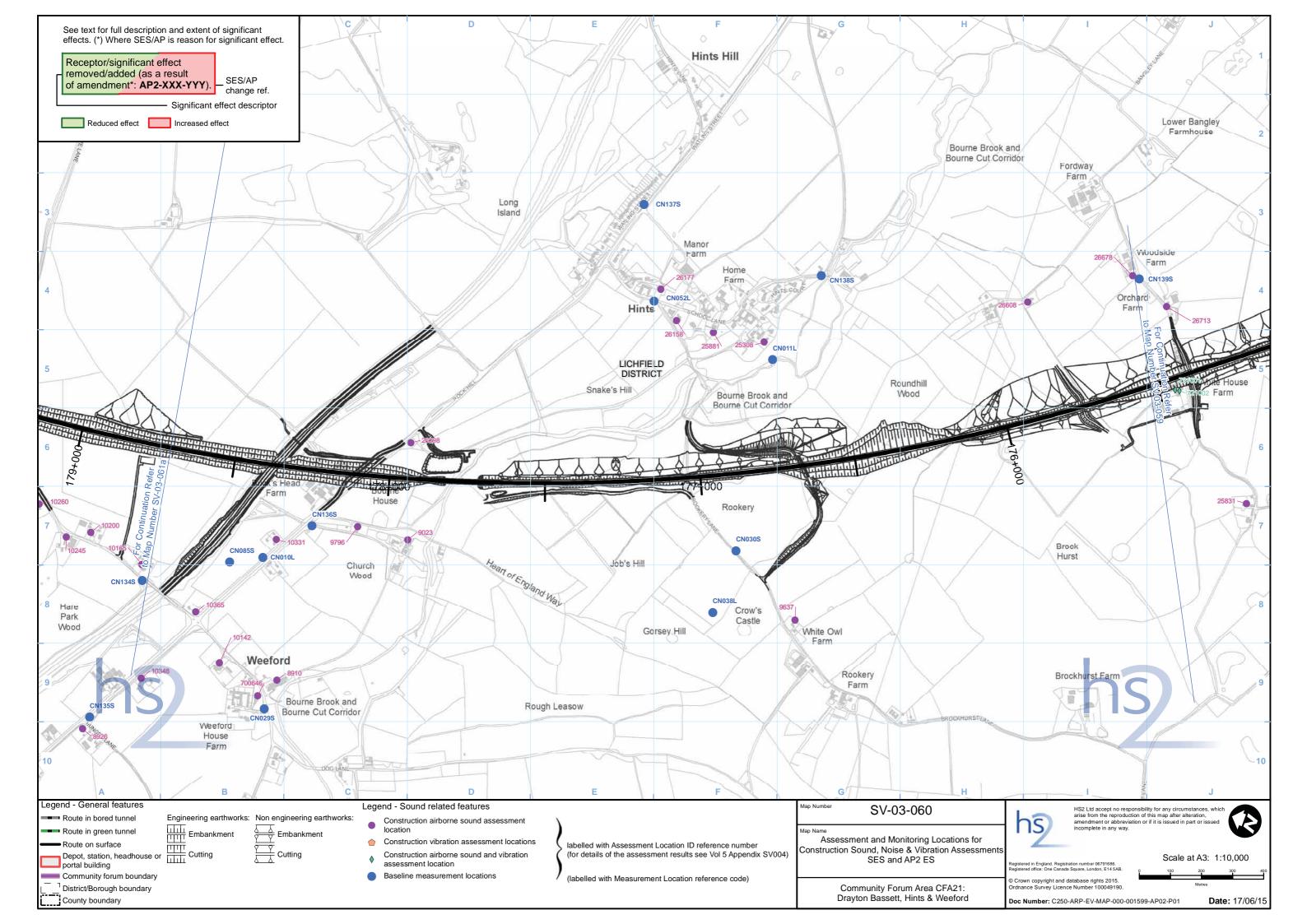


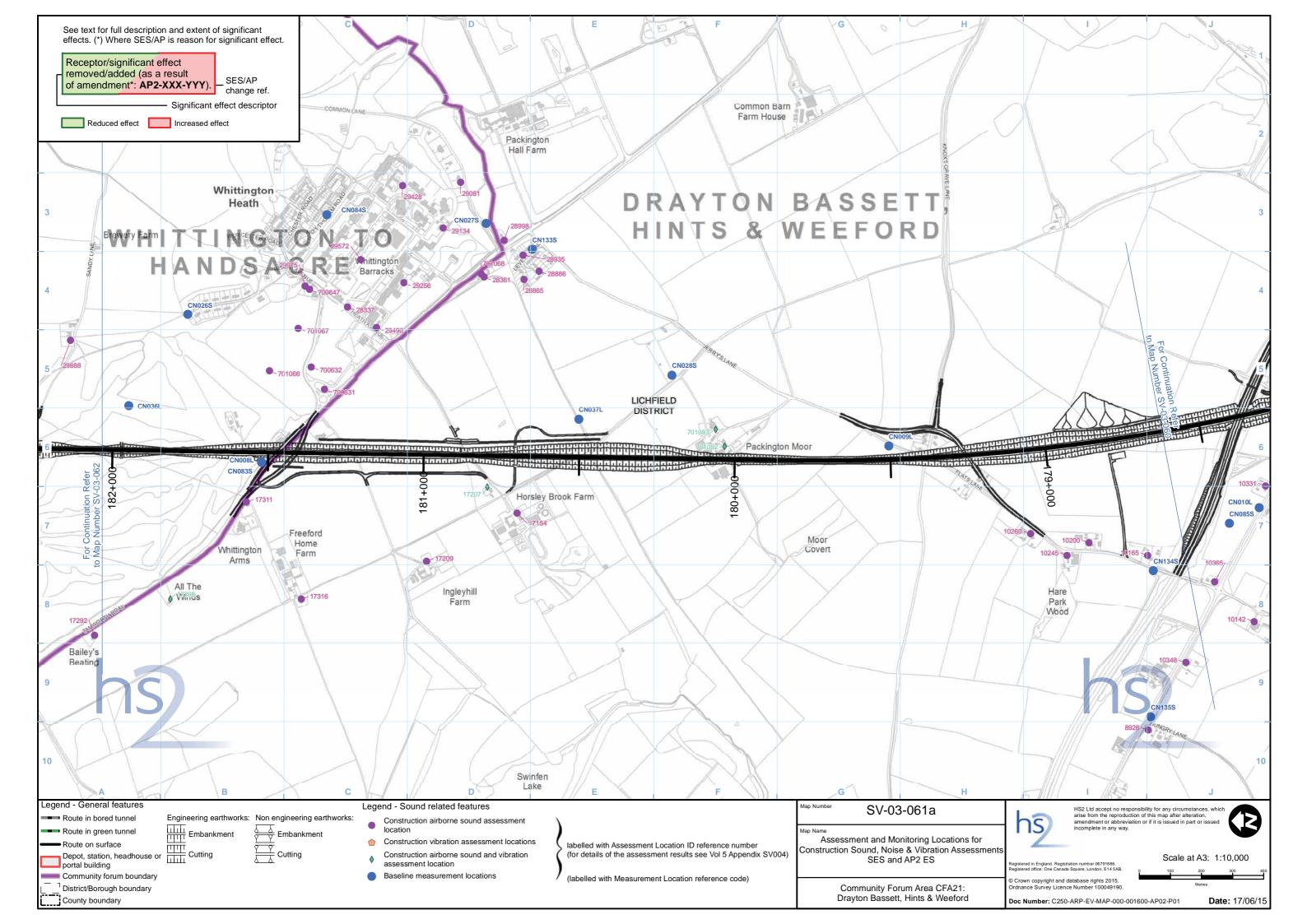












## HIGH SPEED RAIL (LONDON - WEST MIDLANDS)

Supplementary Environmental Statement and Additional Provision 2 Environmental Statement

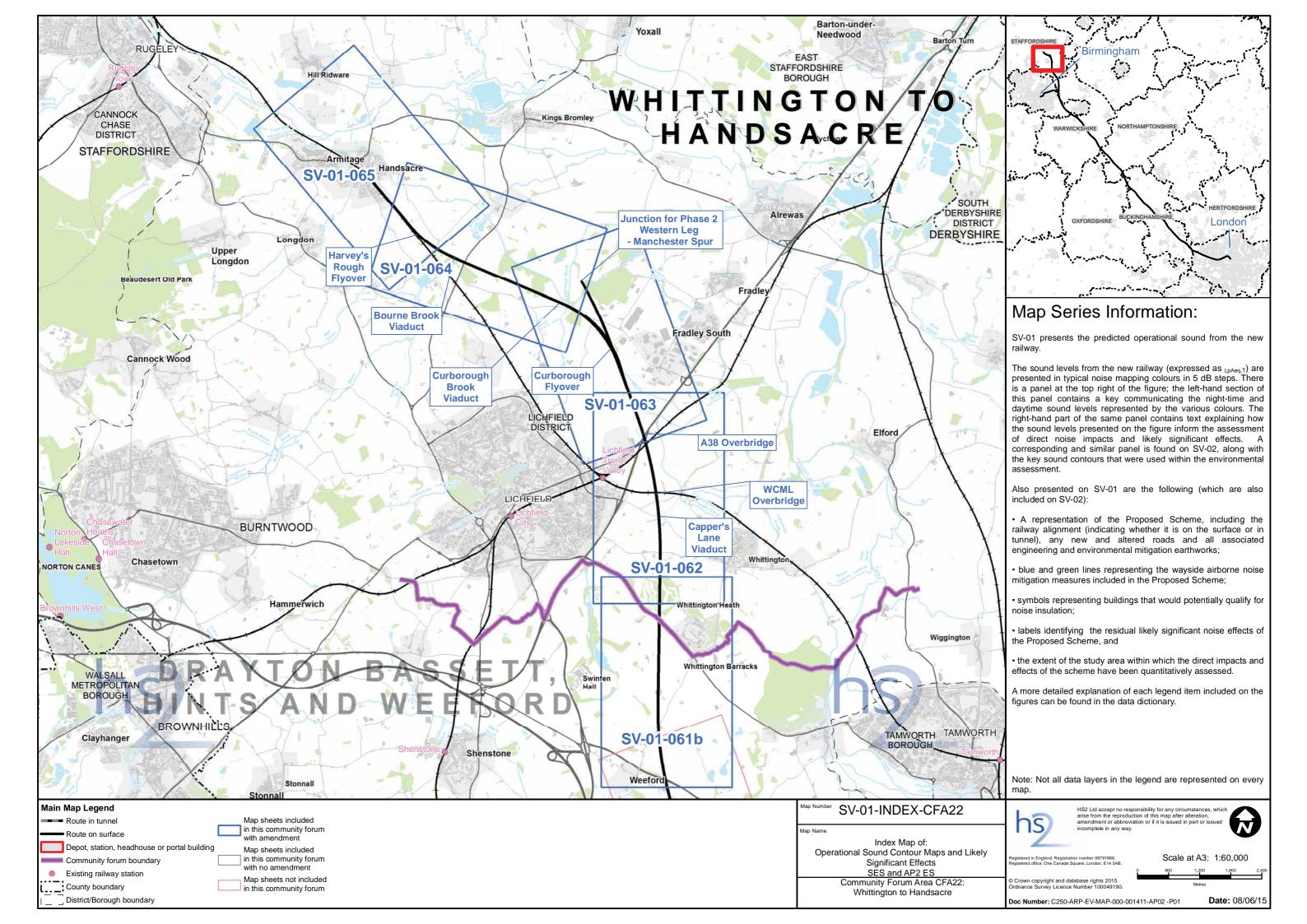
Volume 5 | CFA22 | Whittington to Handsacre

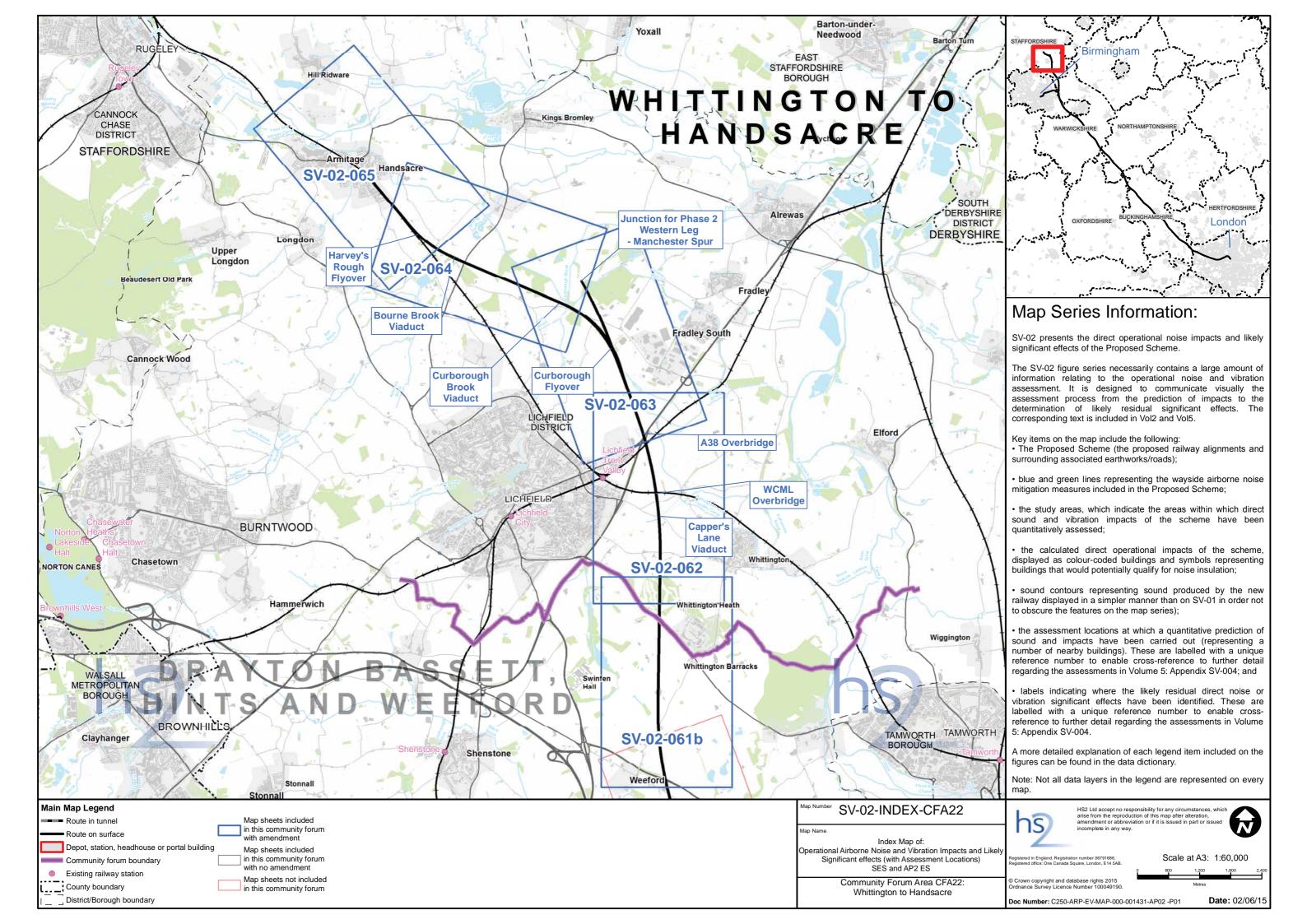
SV-01 – Operational Sound Contour Maps and Likely Significant Effects

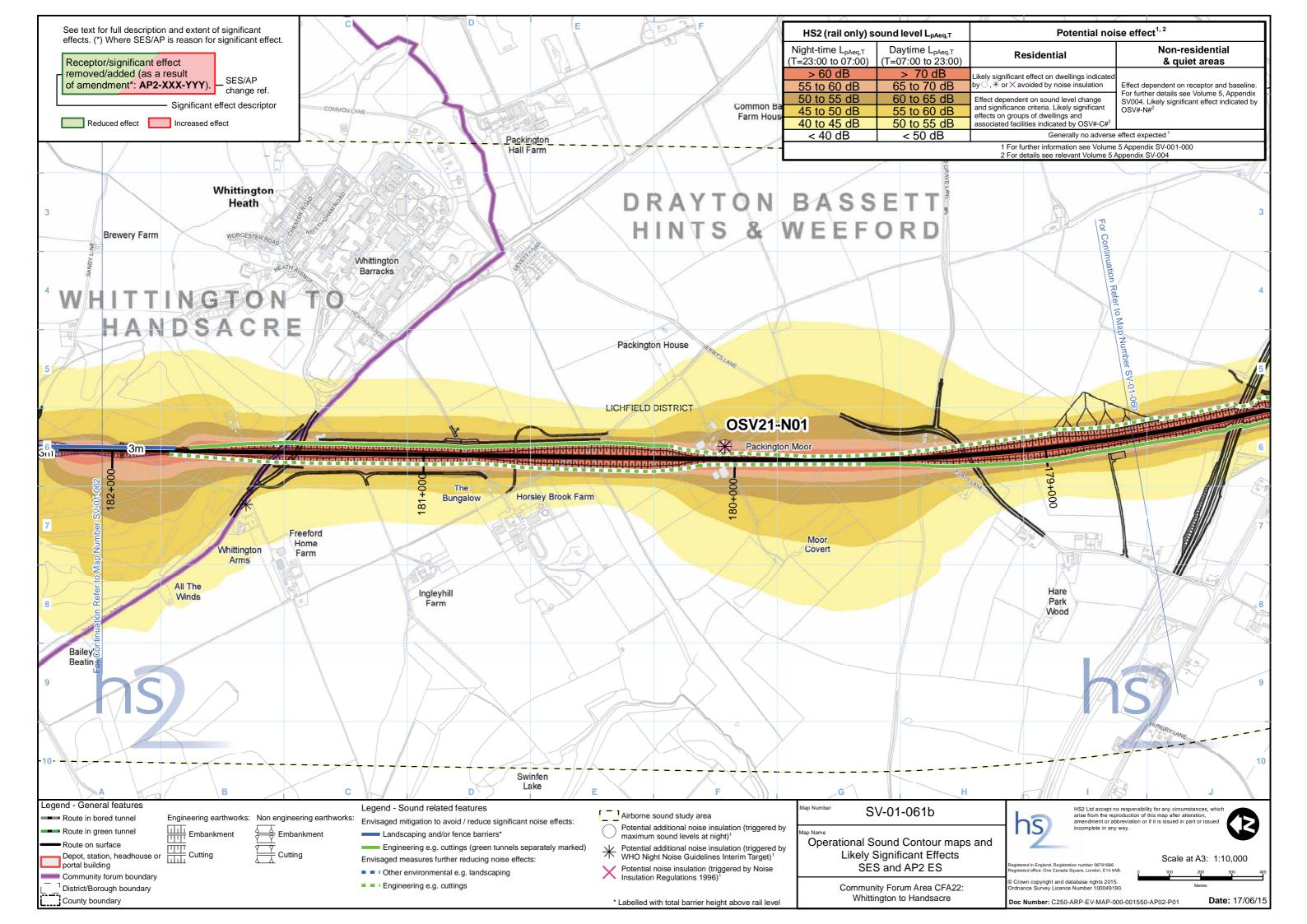
SV-02 – Operational Airborne Noise and Vibration Impacts and Likely Significant Effects (with Assessment Locations)

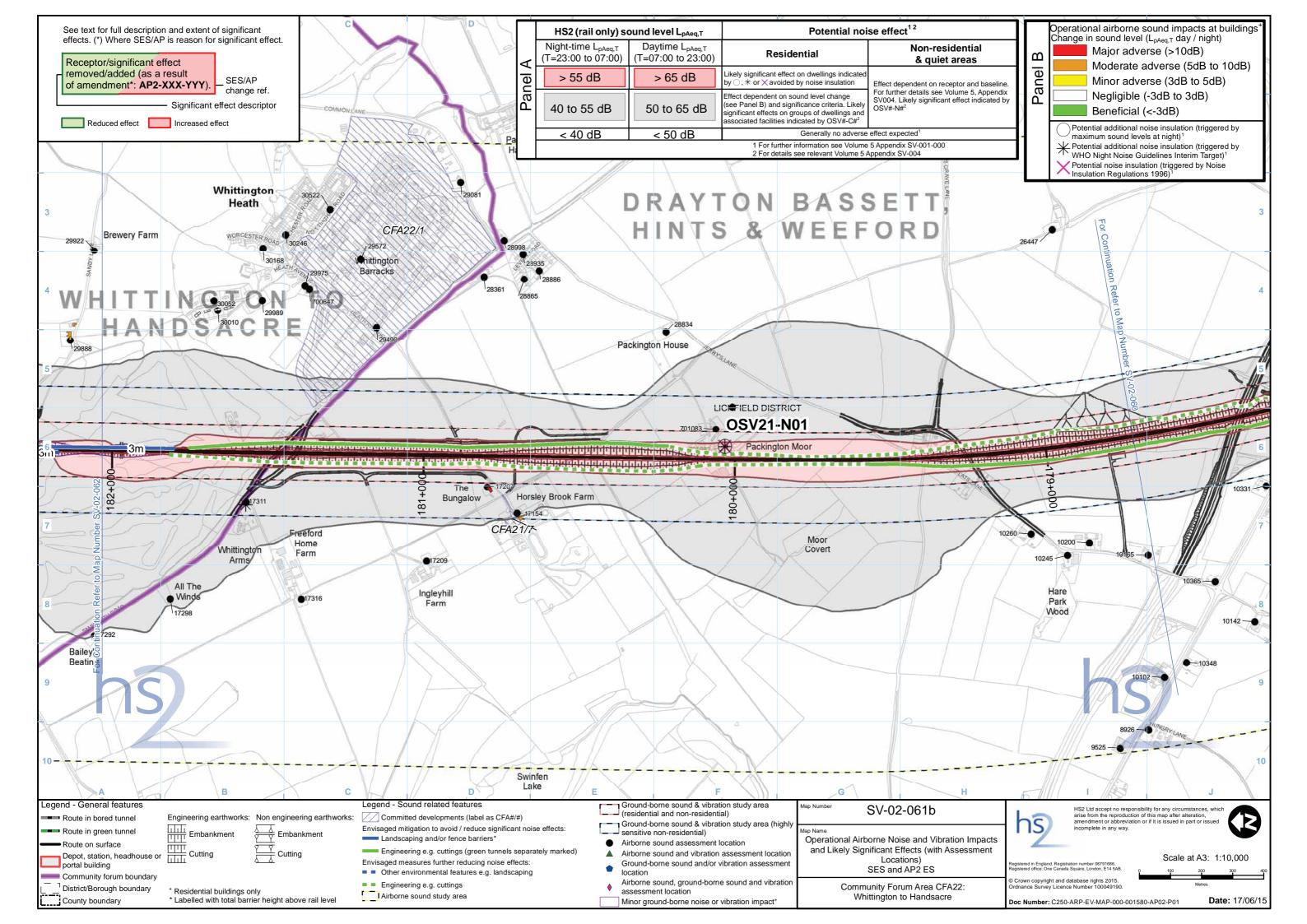
SV-03 – Assessment and Monitoring Locations for Construction Sound, Noise & Vibration Assessments

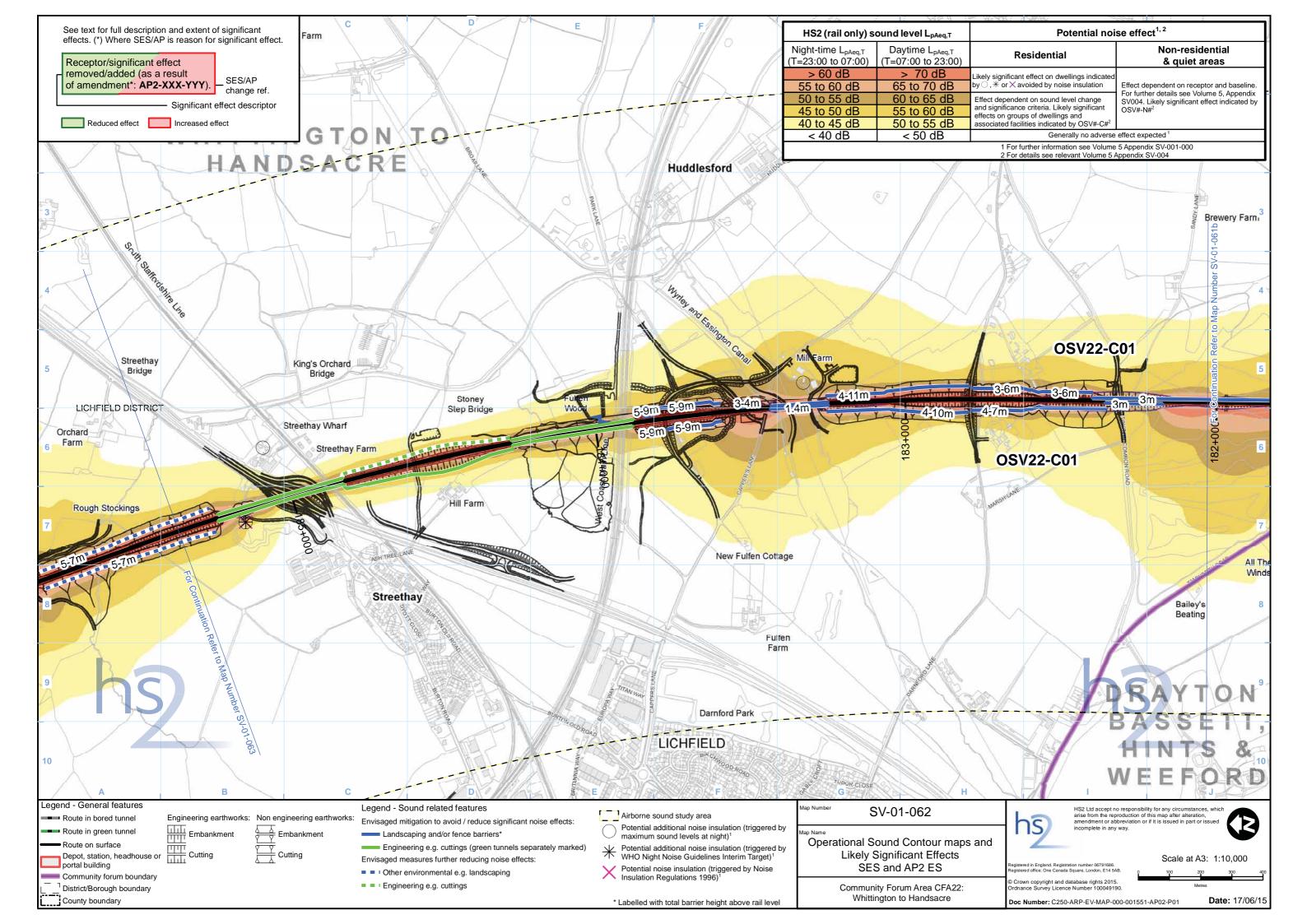
SV-04 – Assessment and Monitoring Locations for Operational Sound, Noise & Vibration Assessments

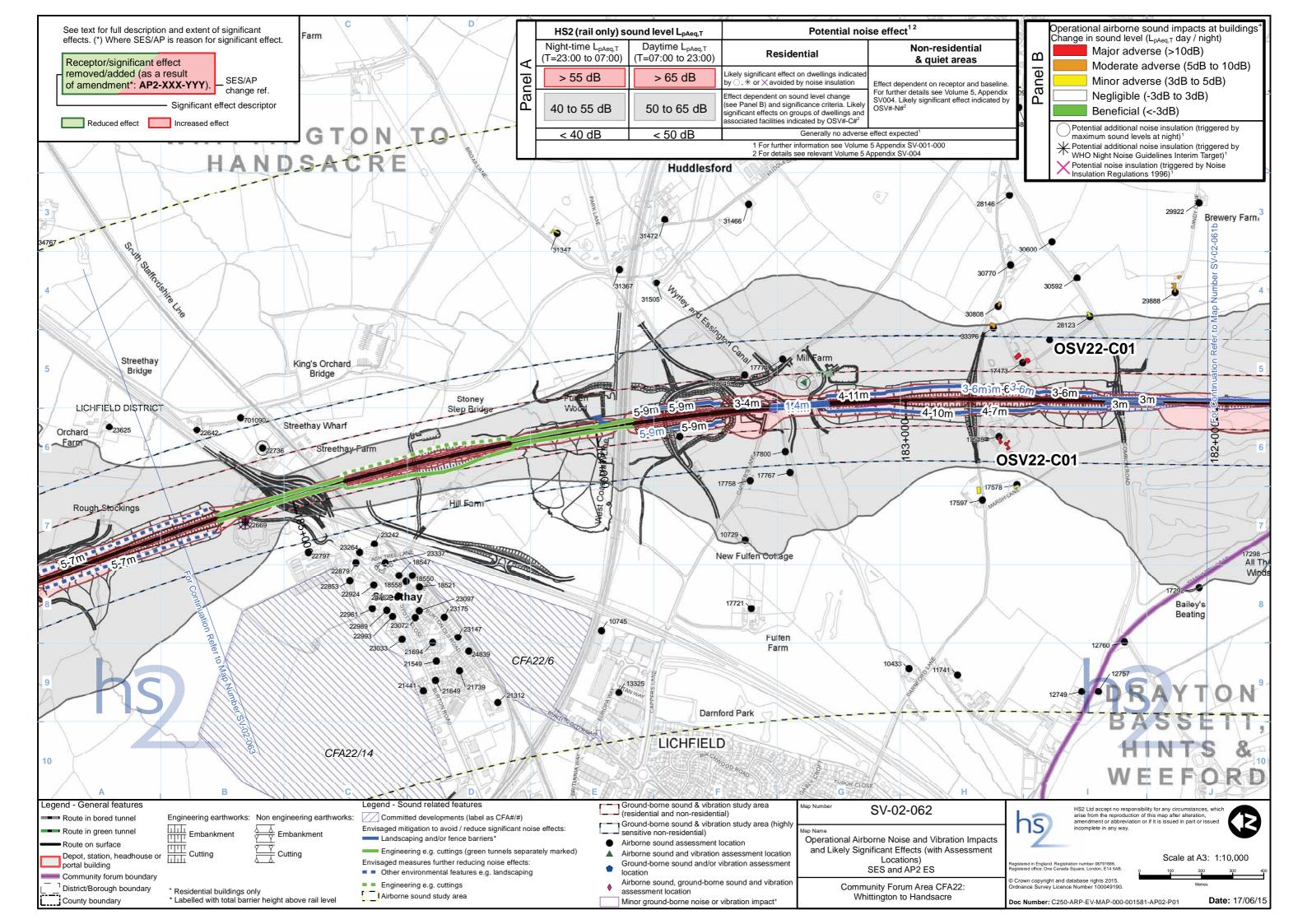


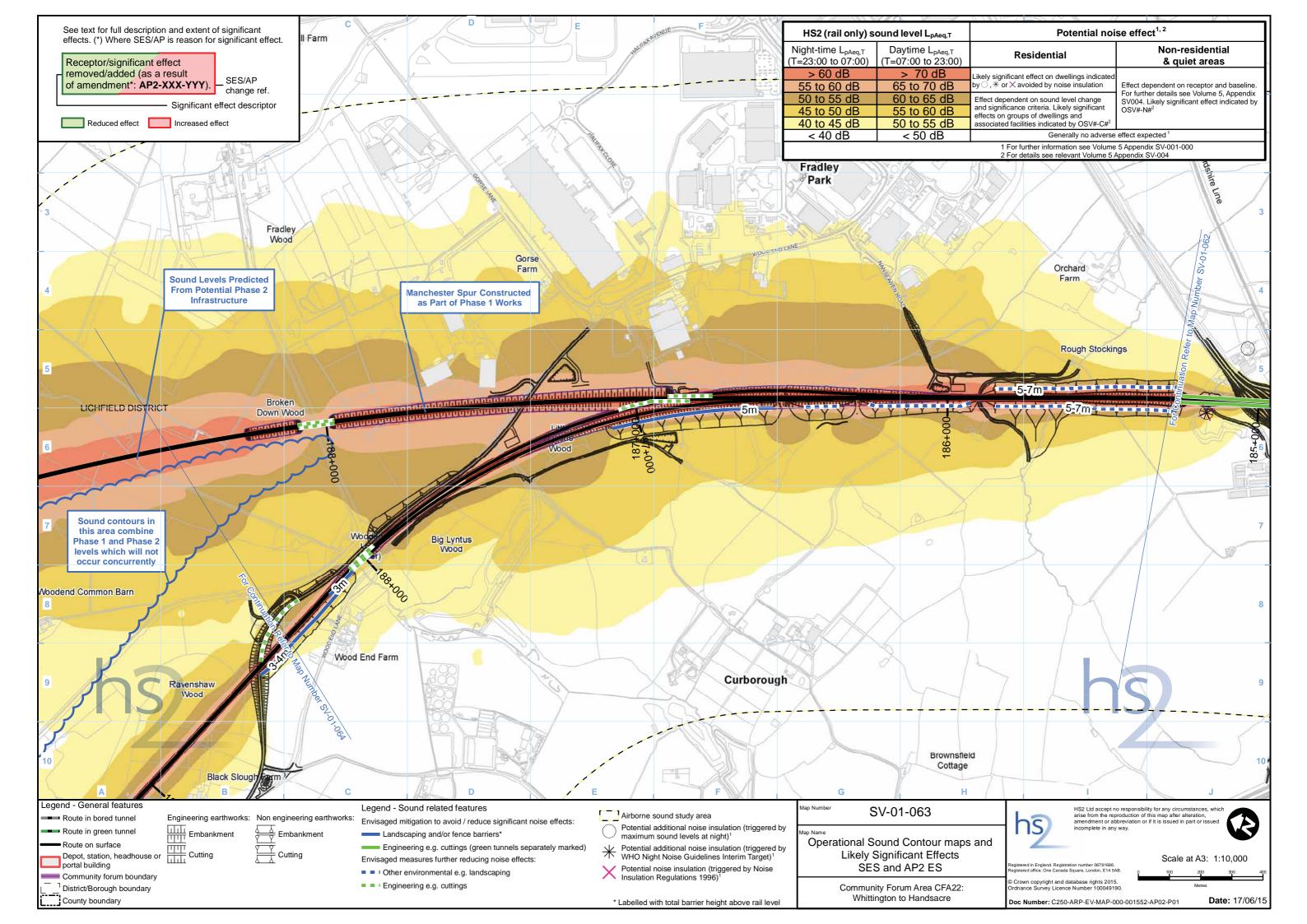


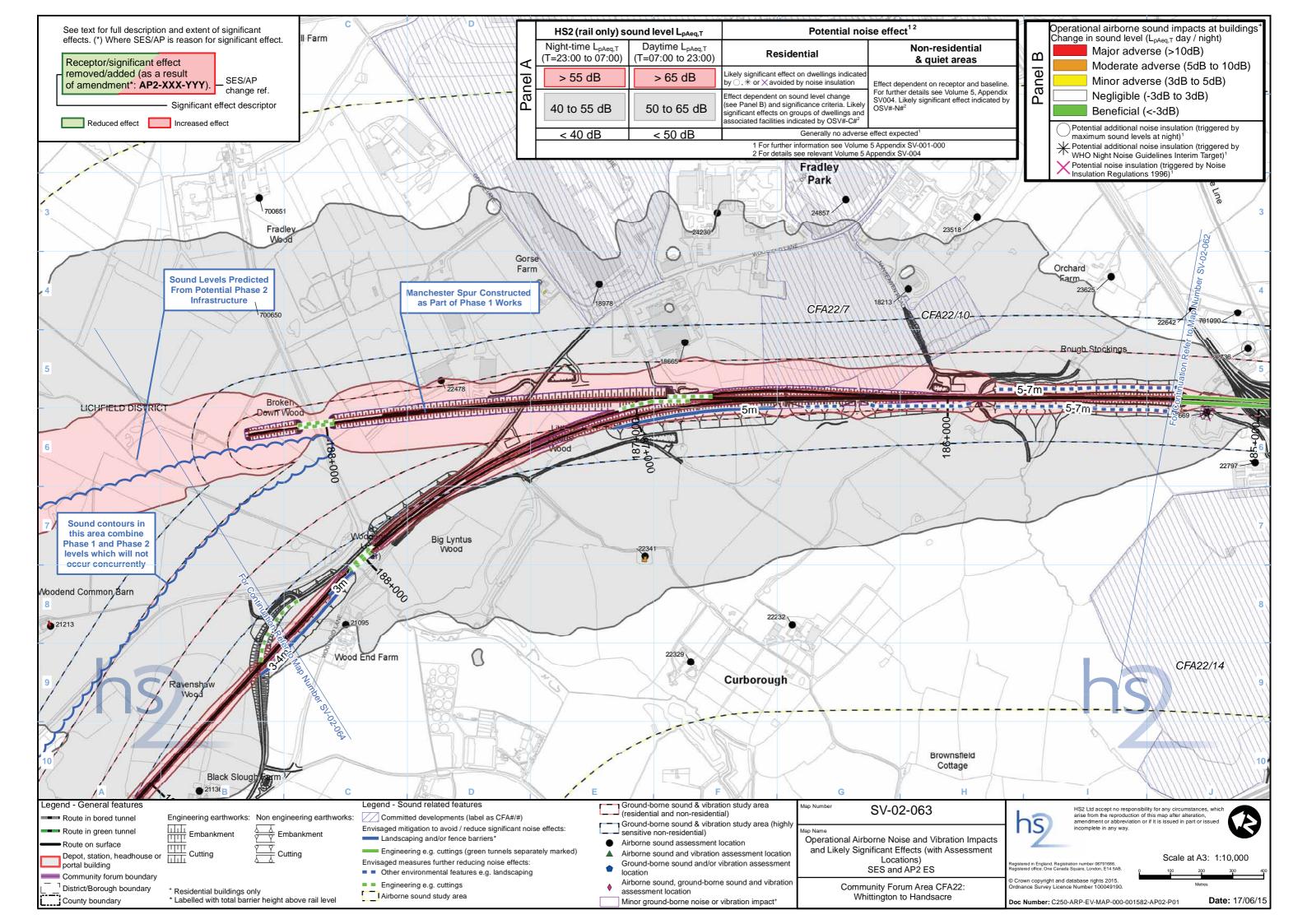


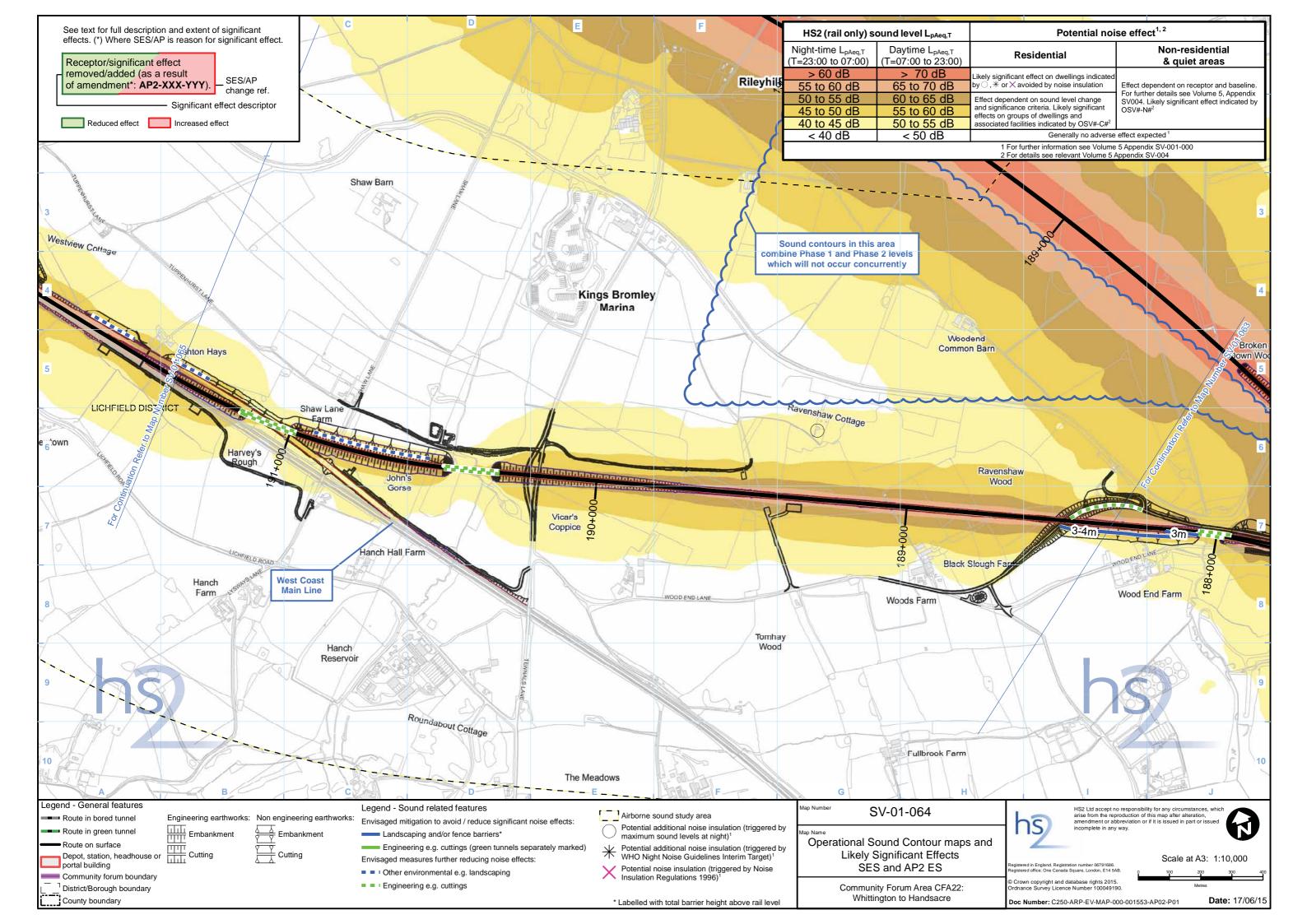


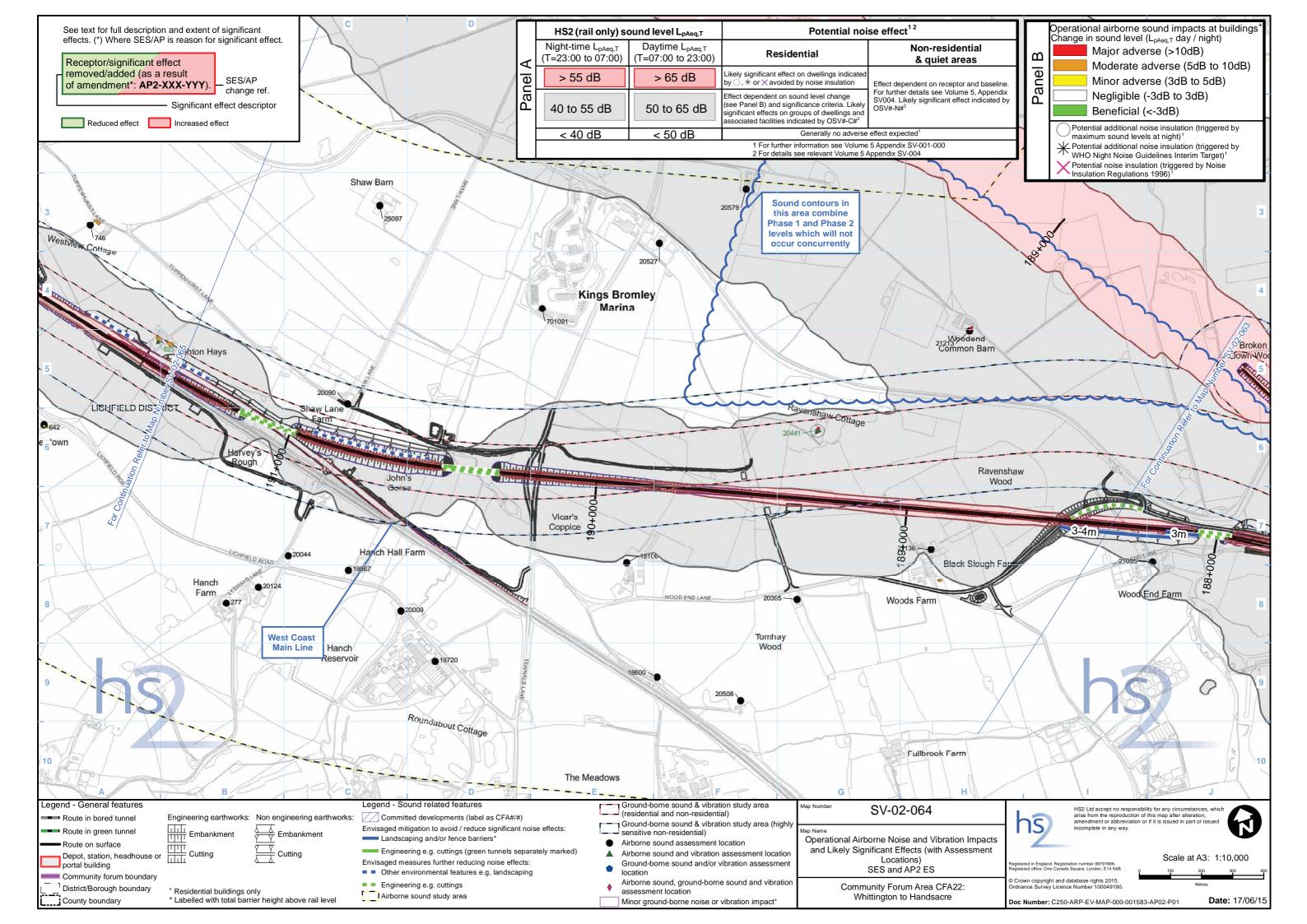


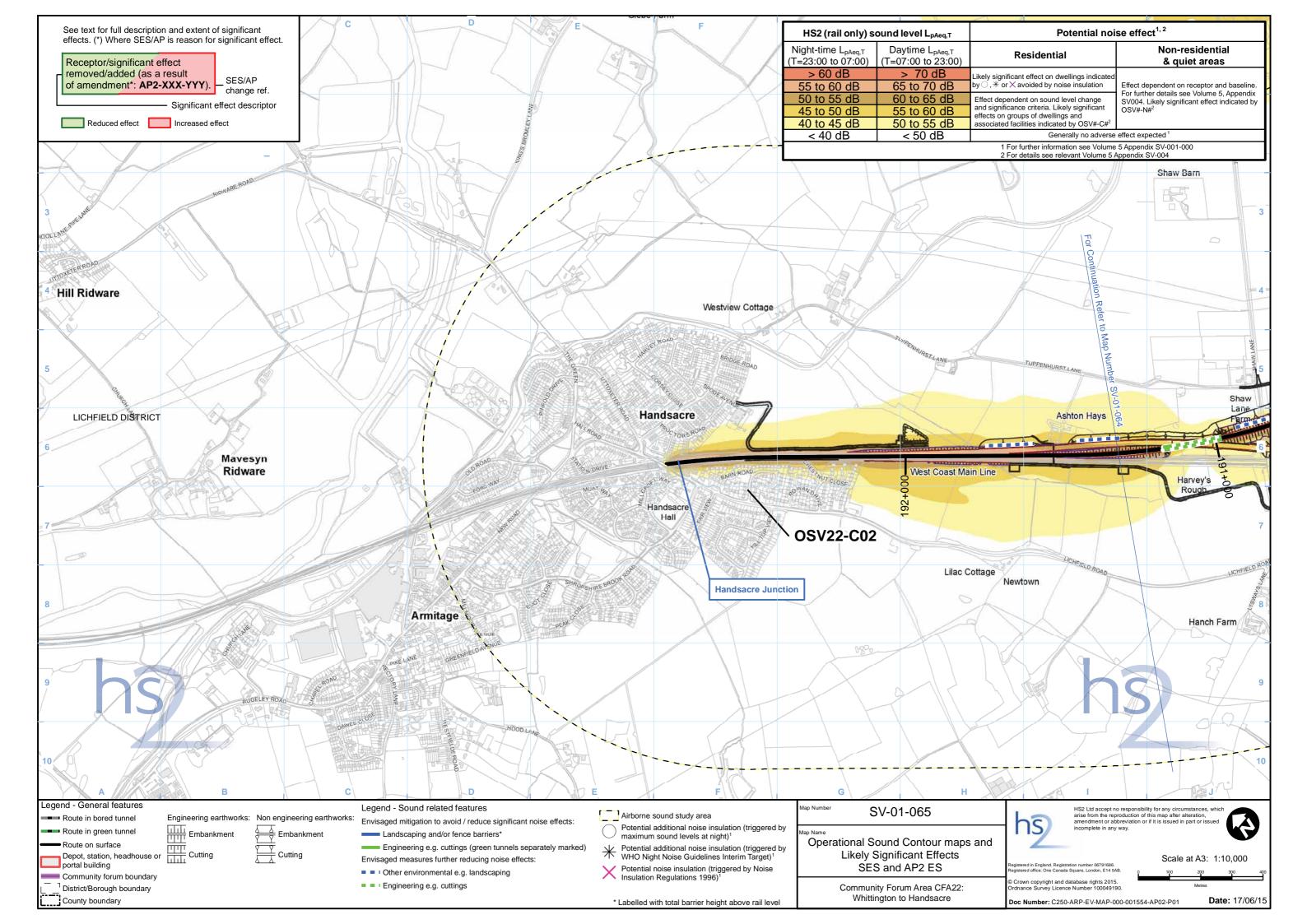


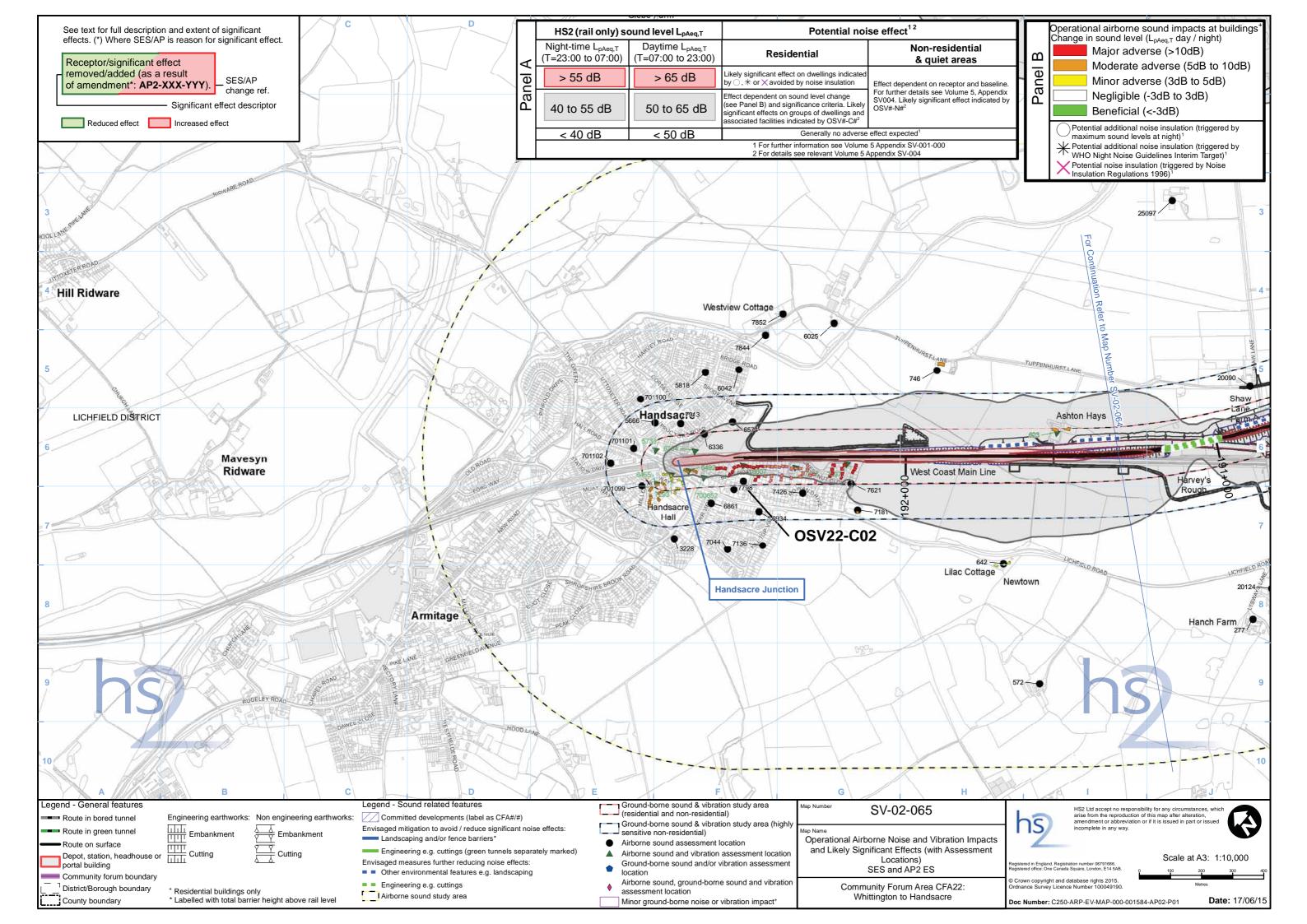


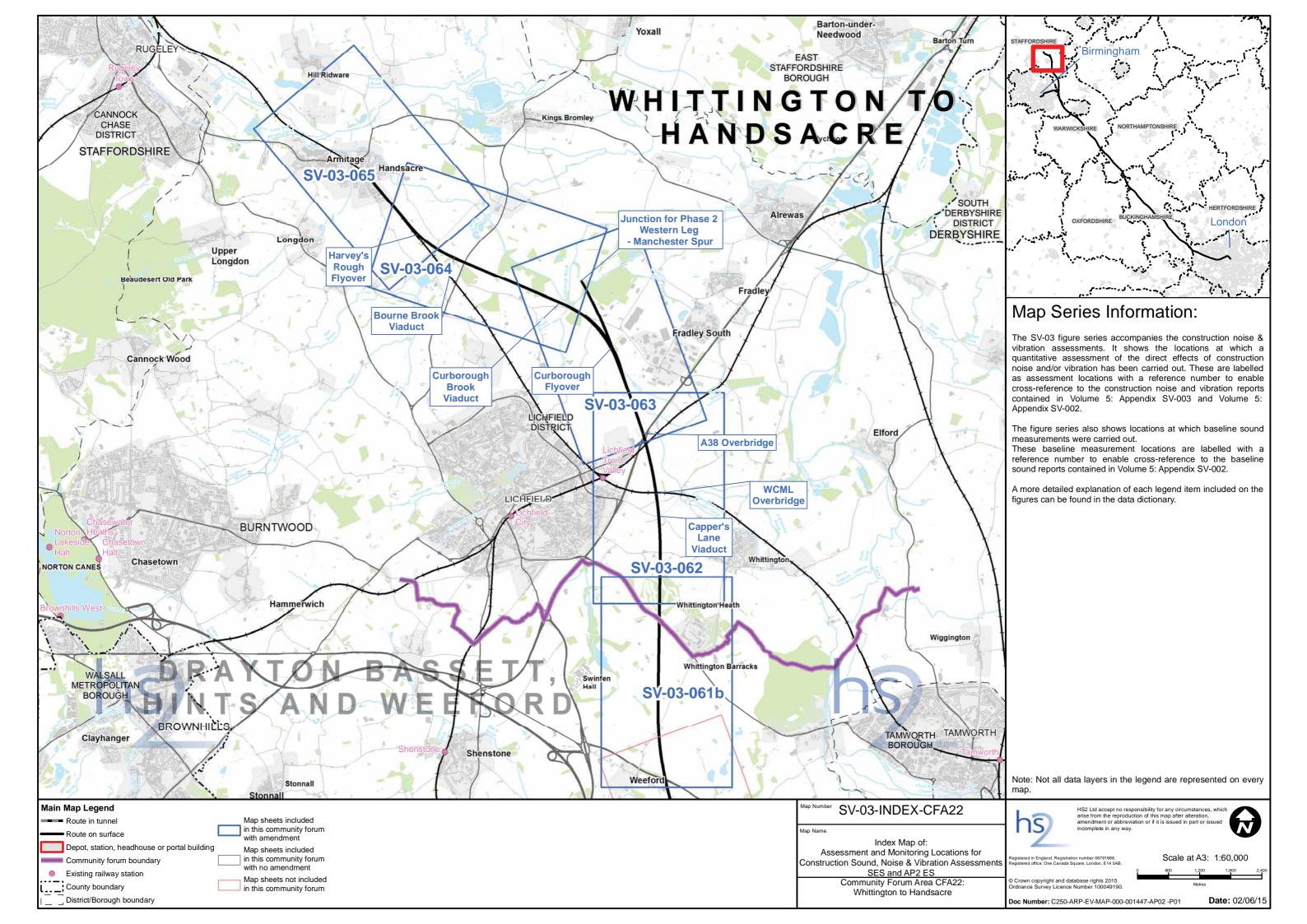


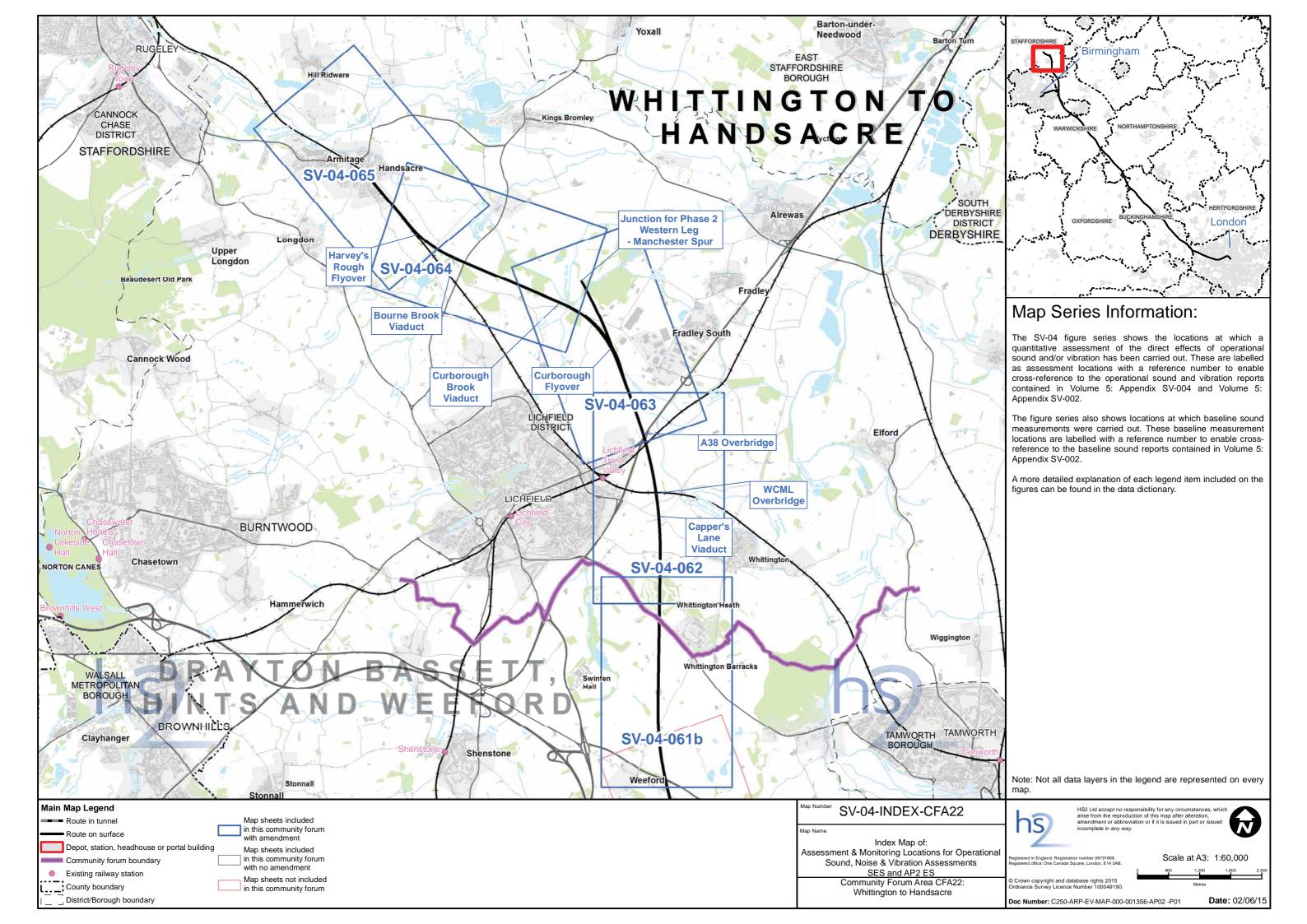


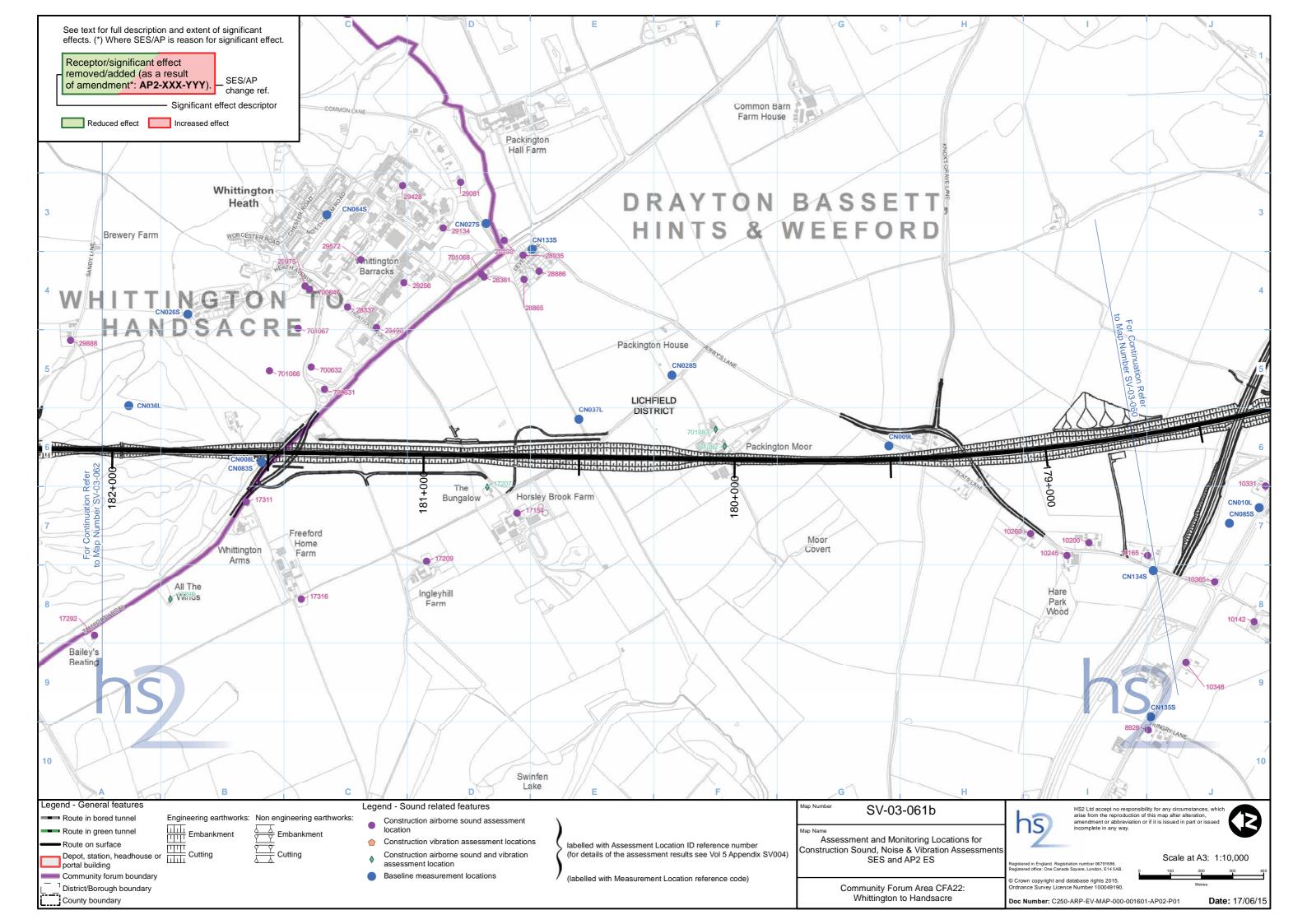


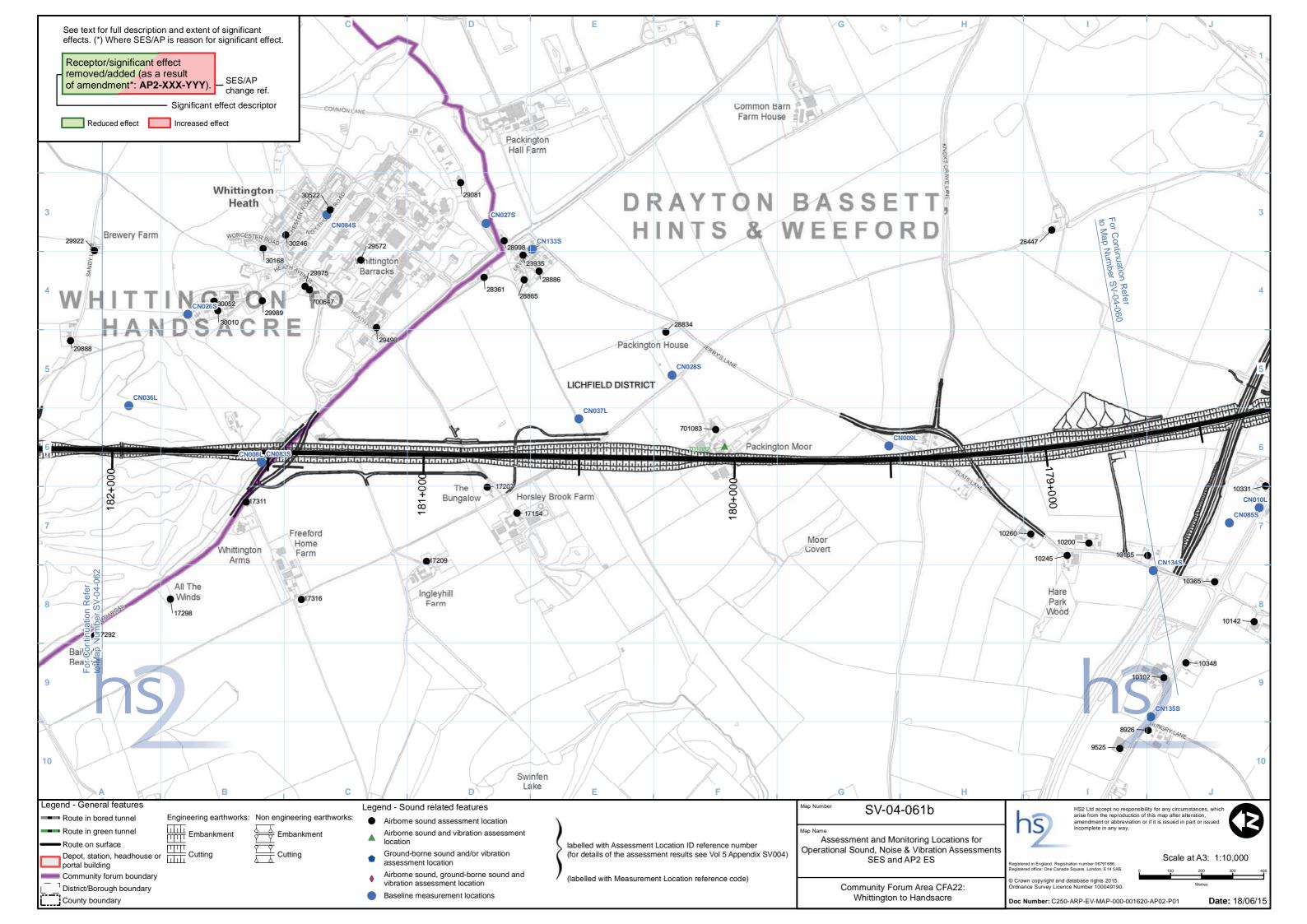


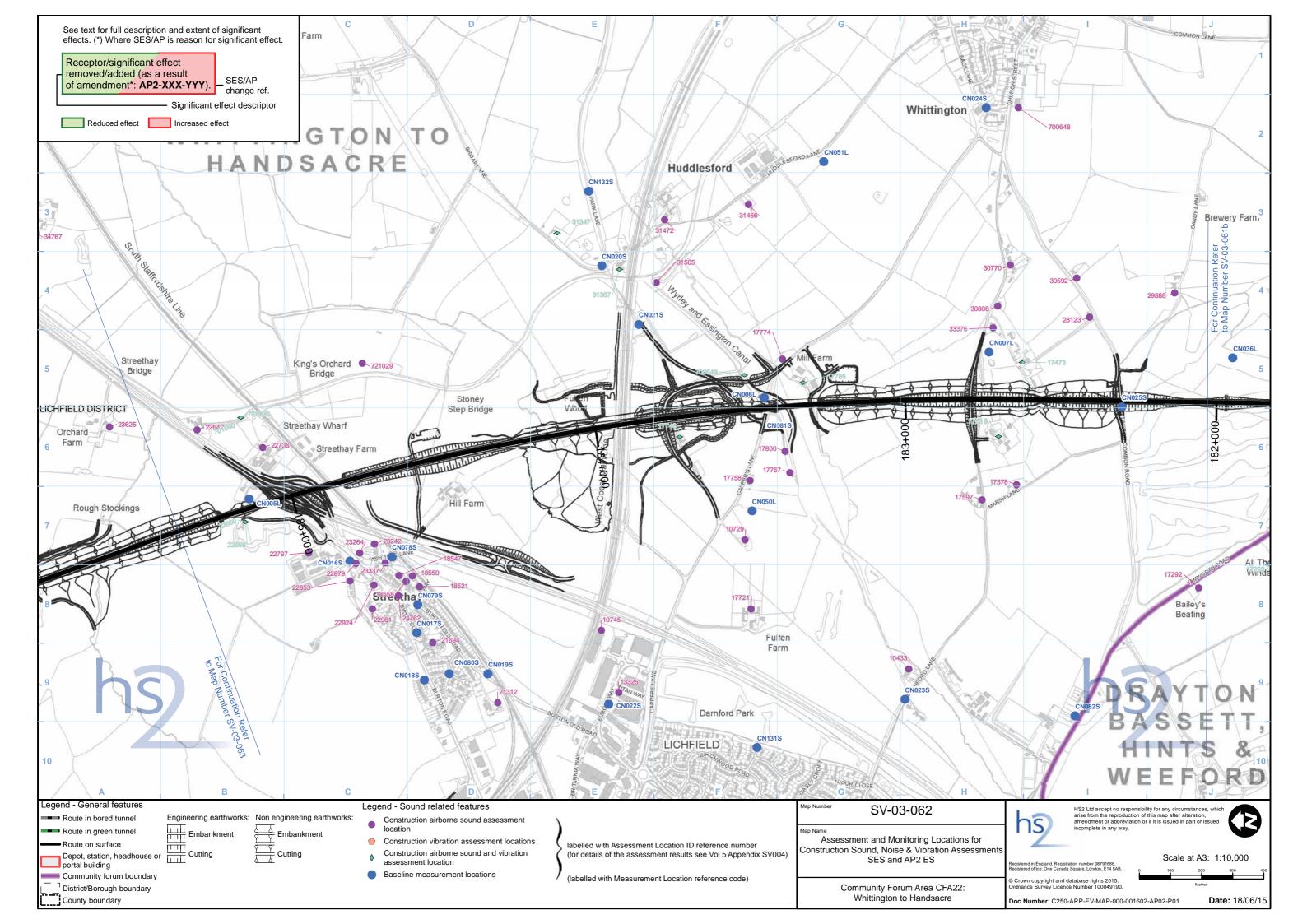


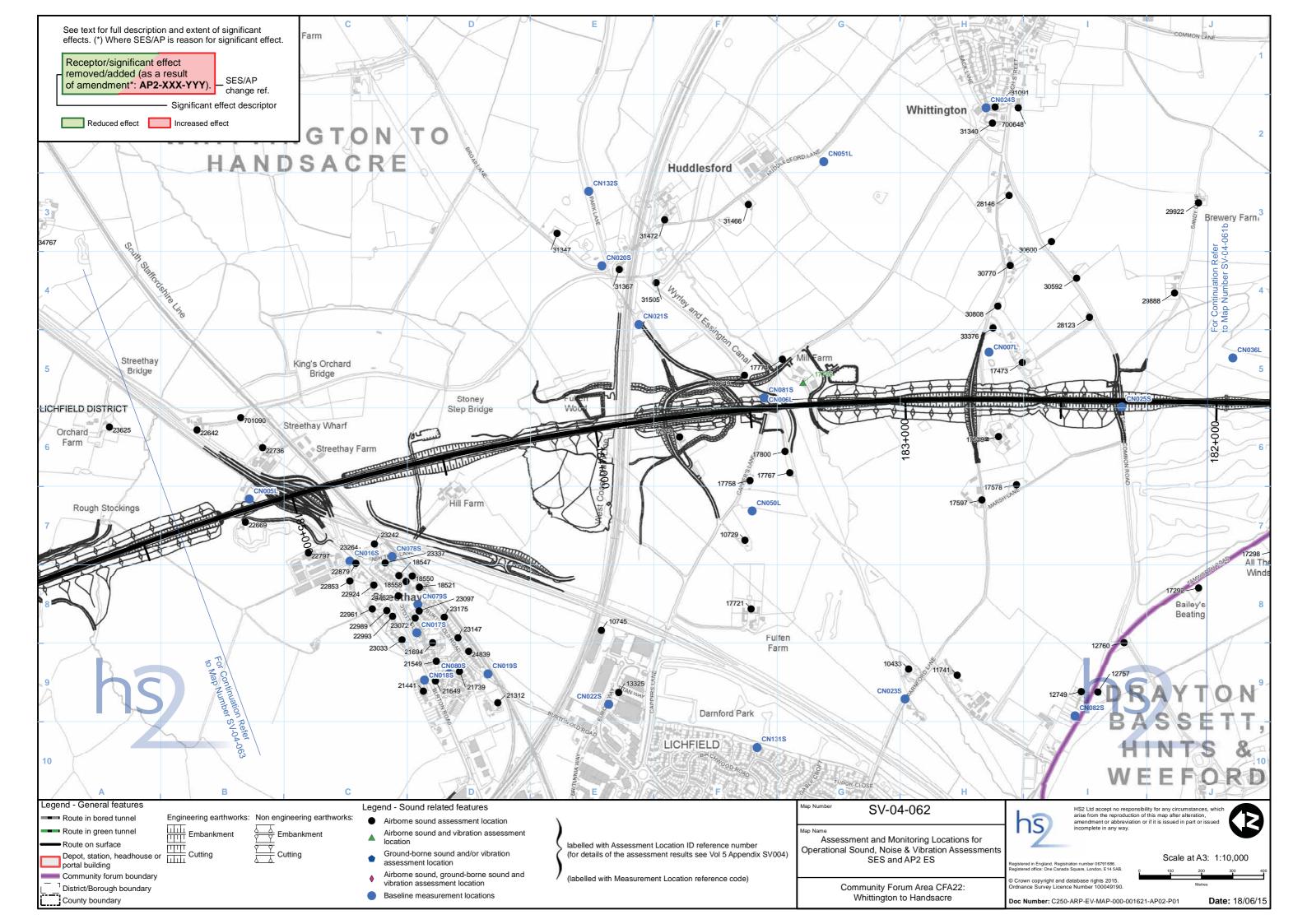


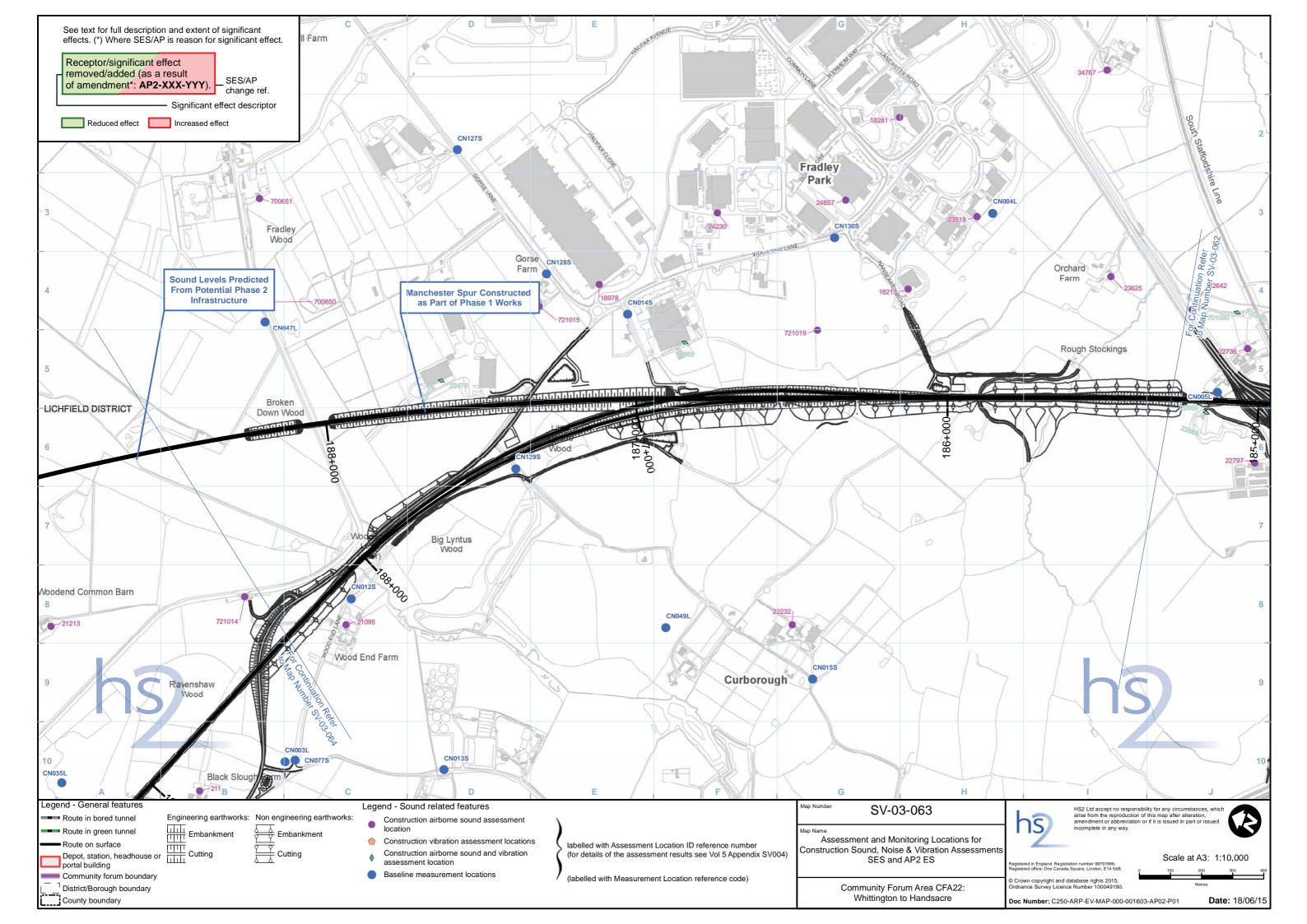


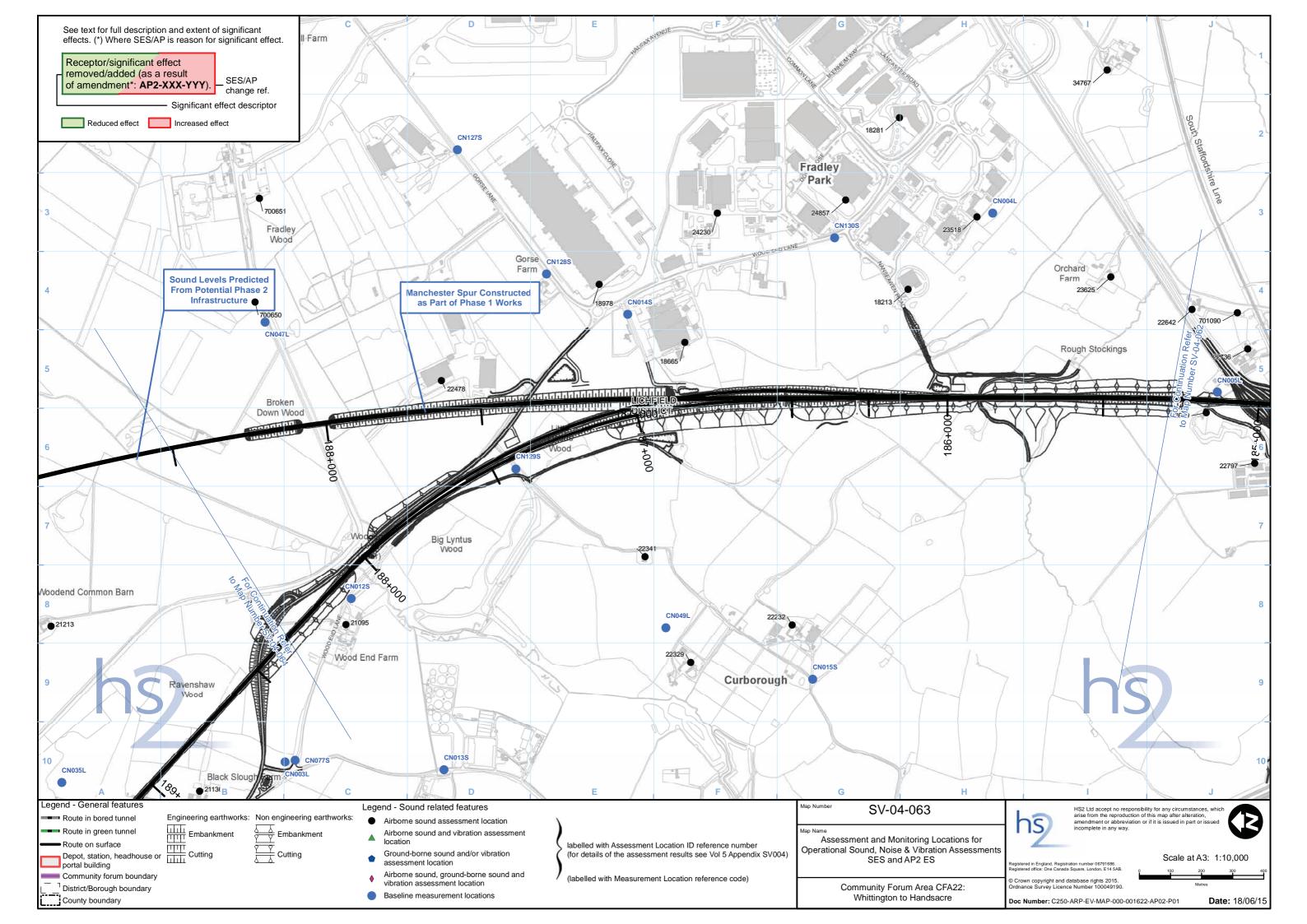


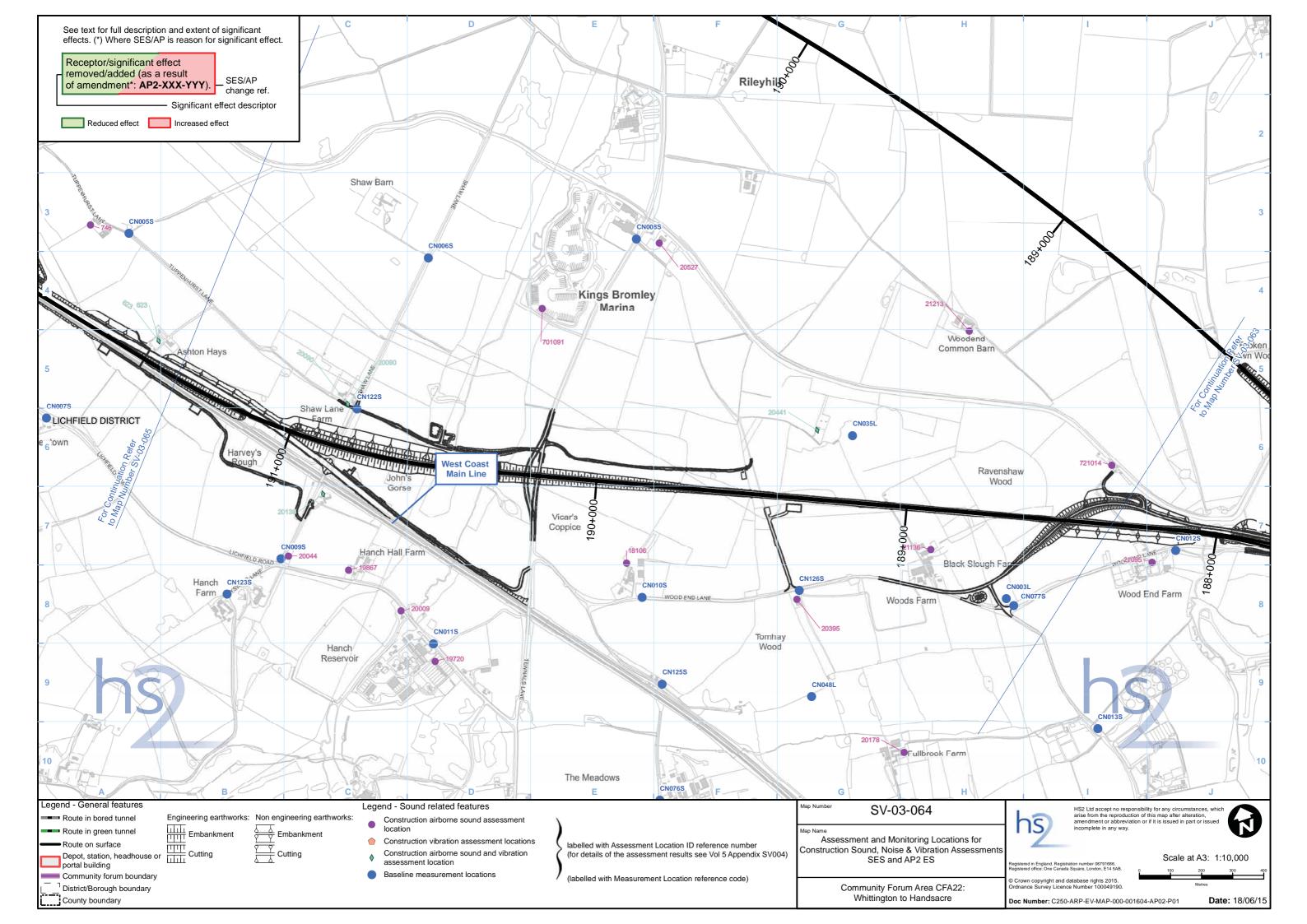


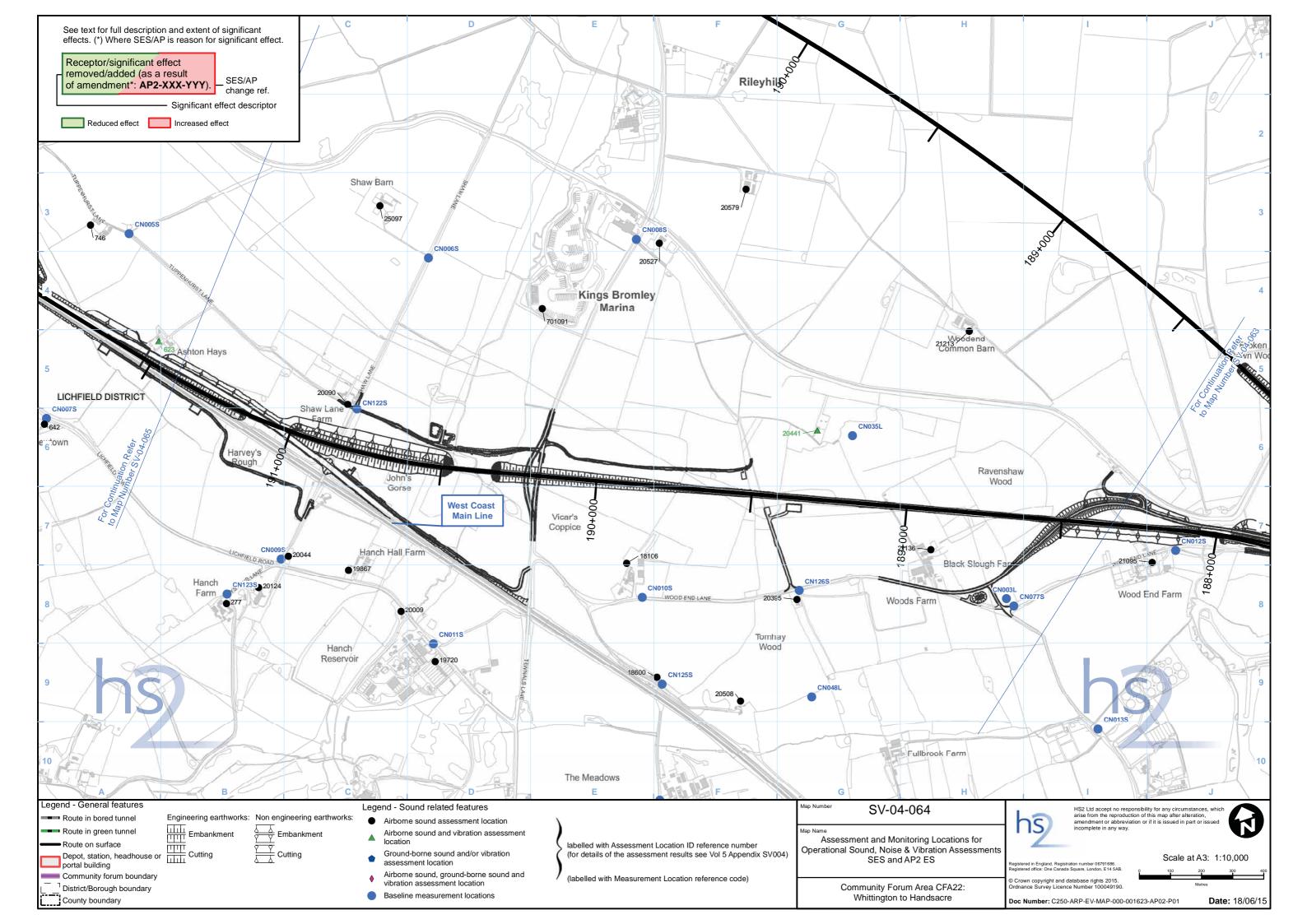


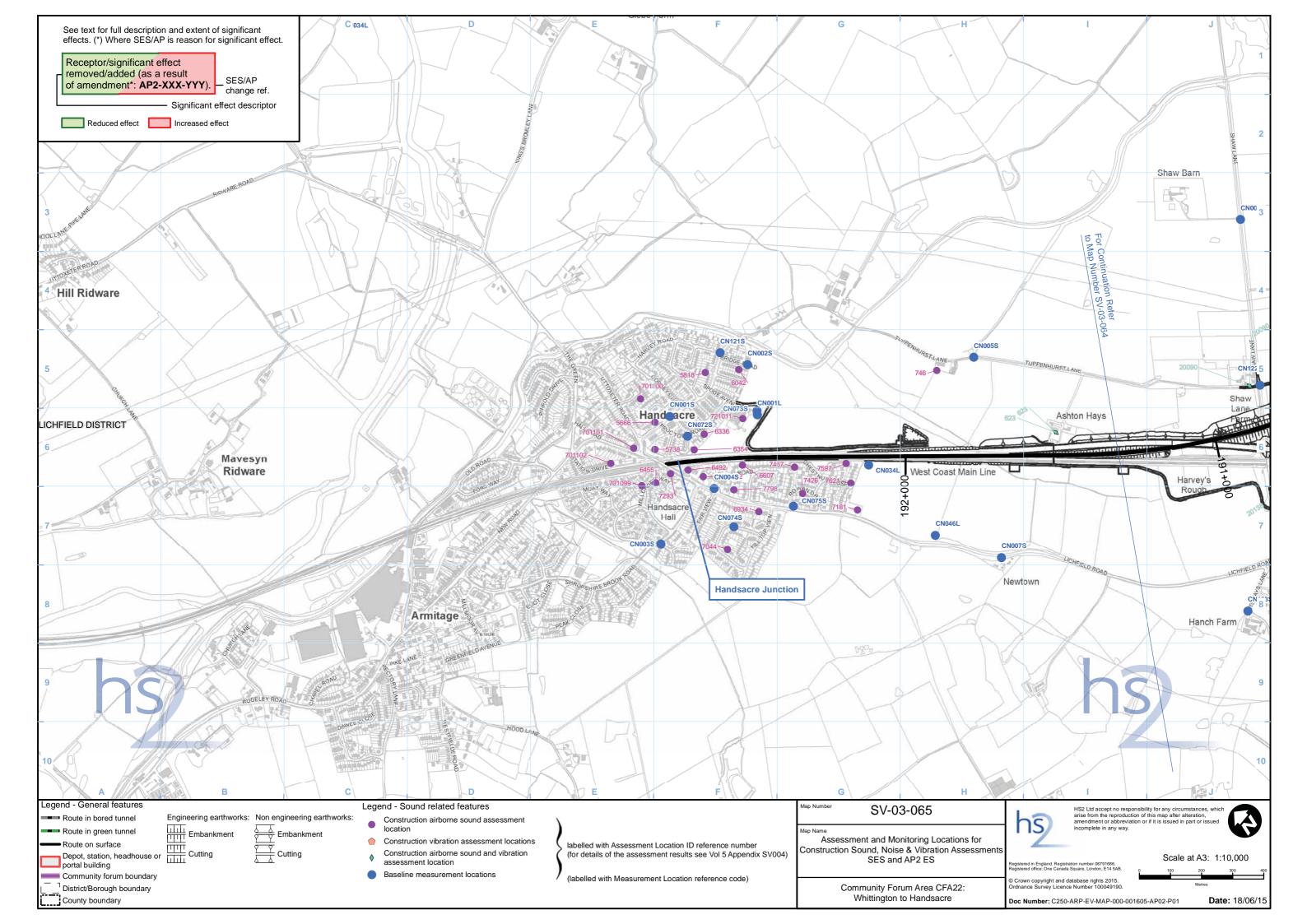


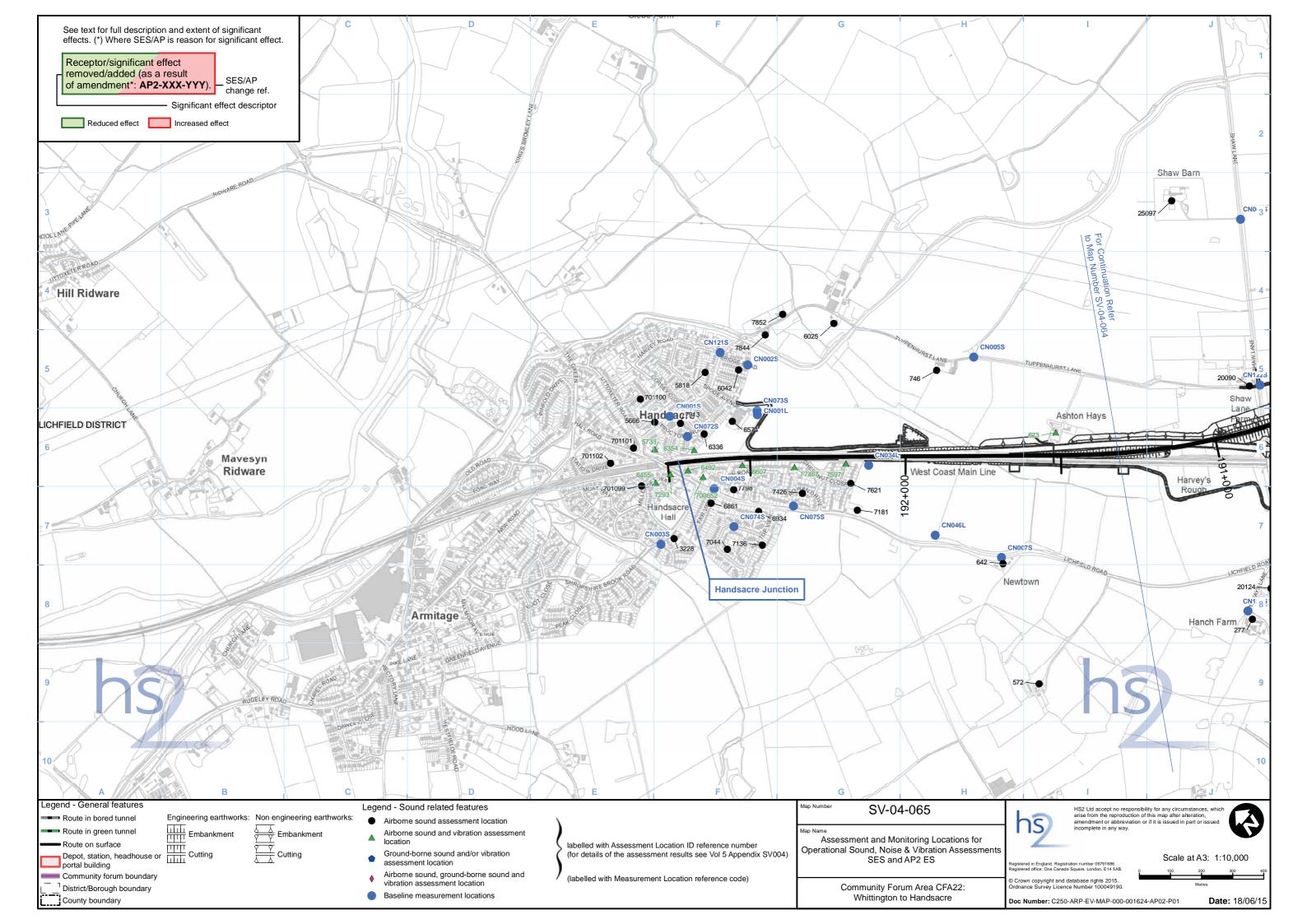


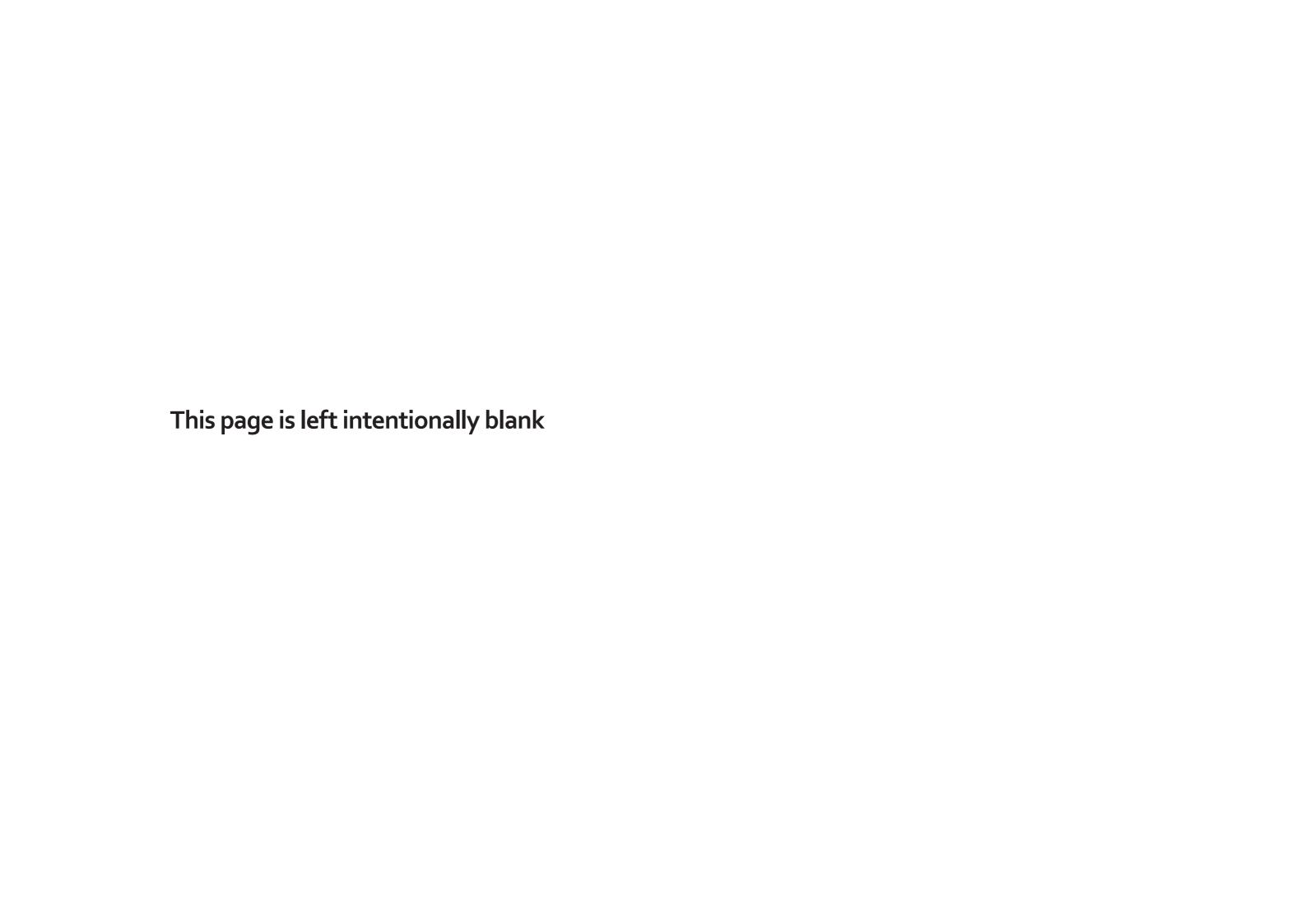










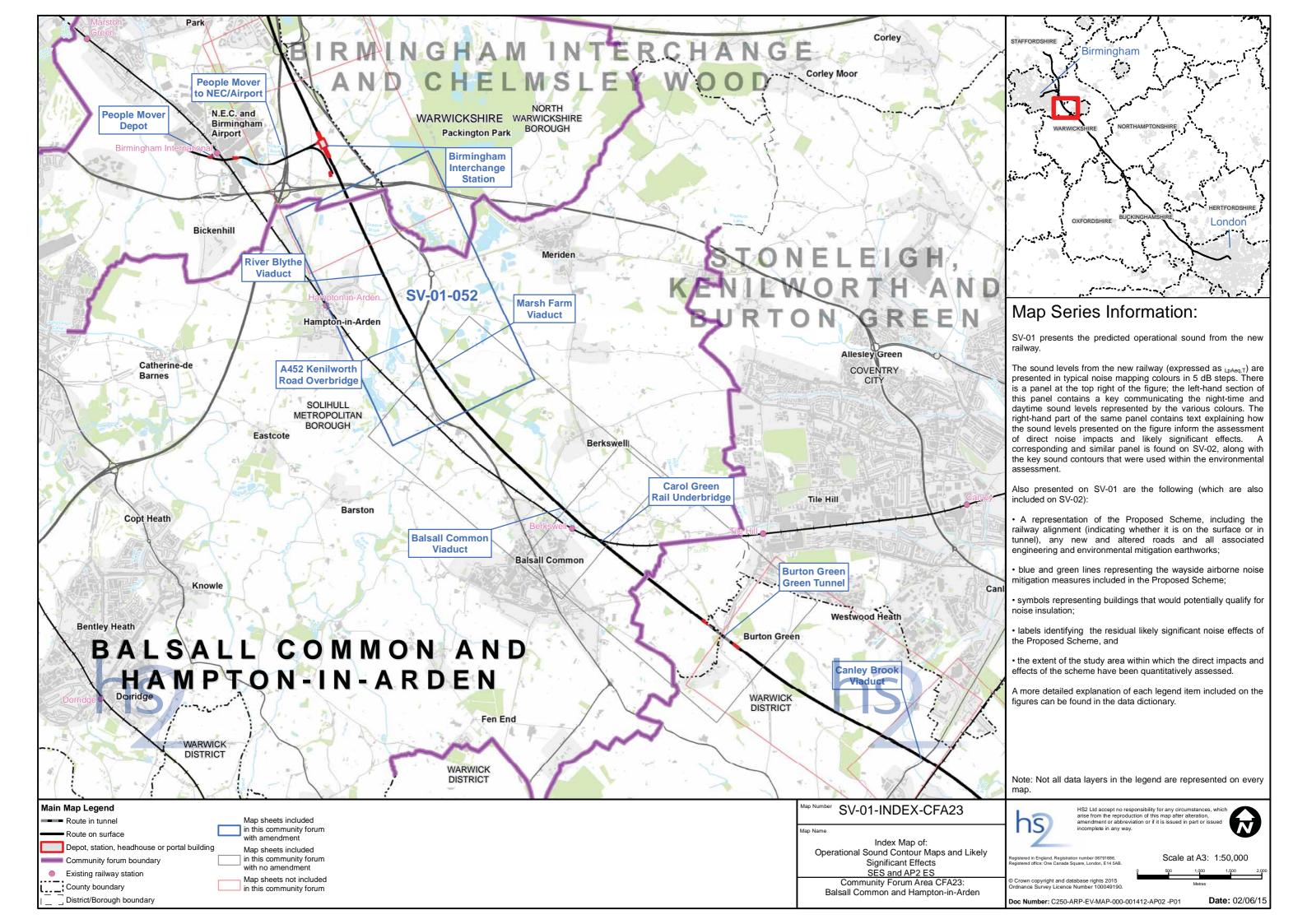


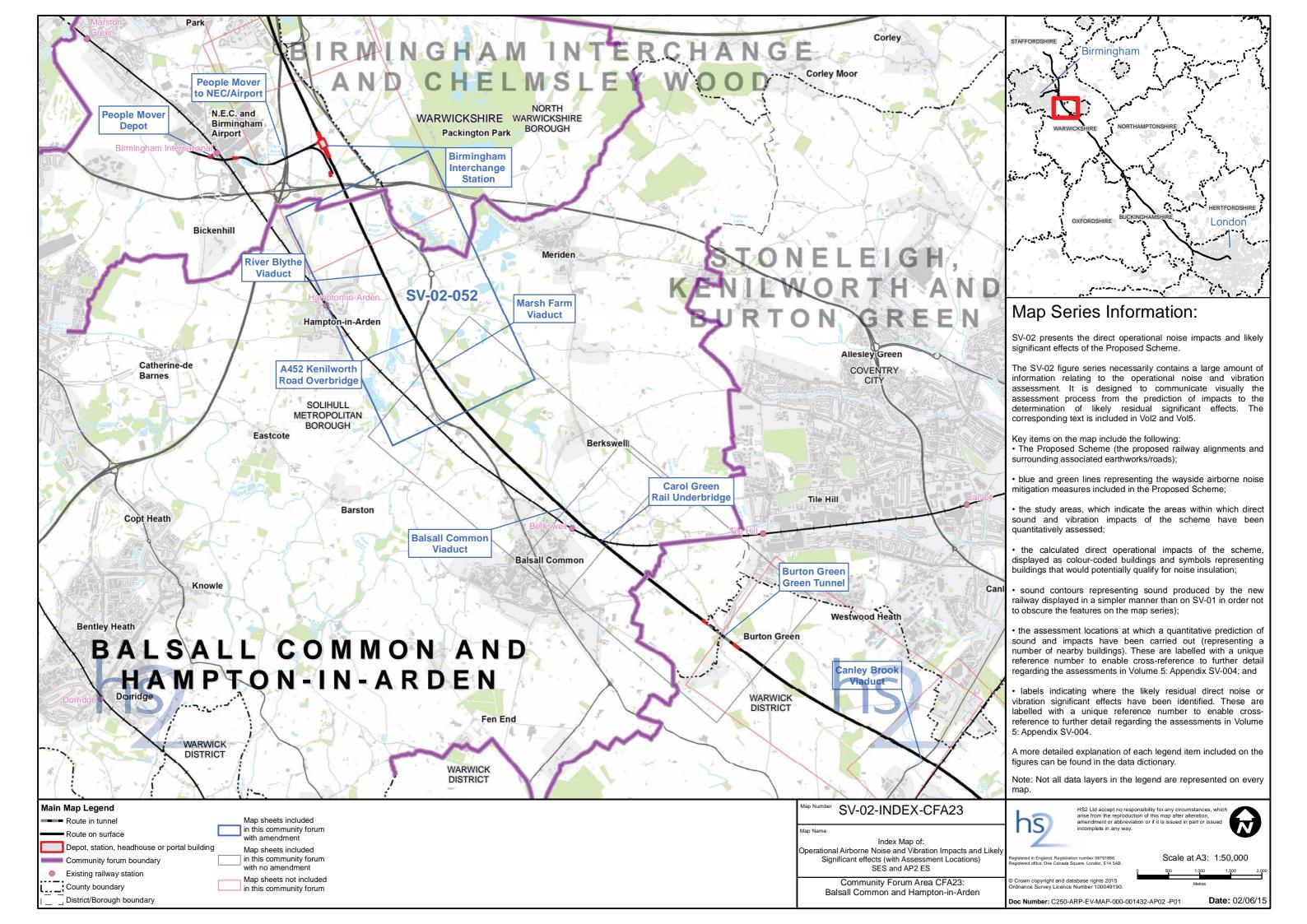
Supplementary Environmental Statement and Additional Provision 2 Environmental Statement

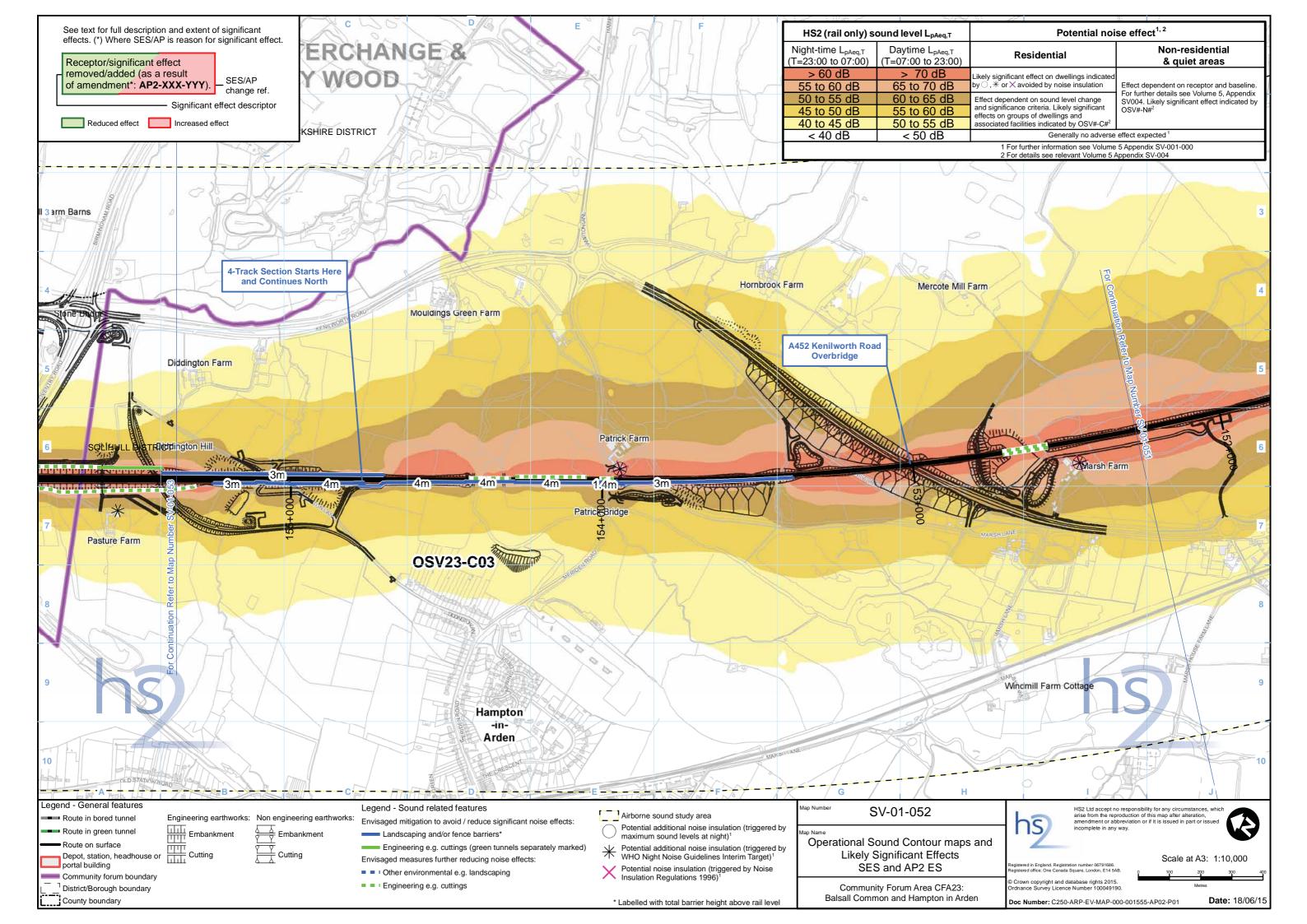
Volume 5 | CFA23 | Balsall Common and Hampton-in-Arden

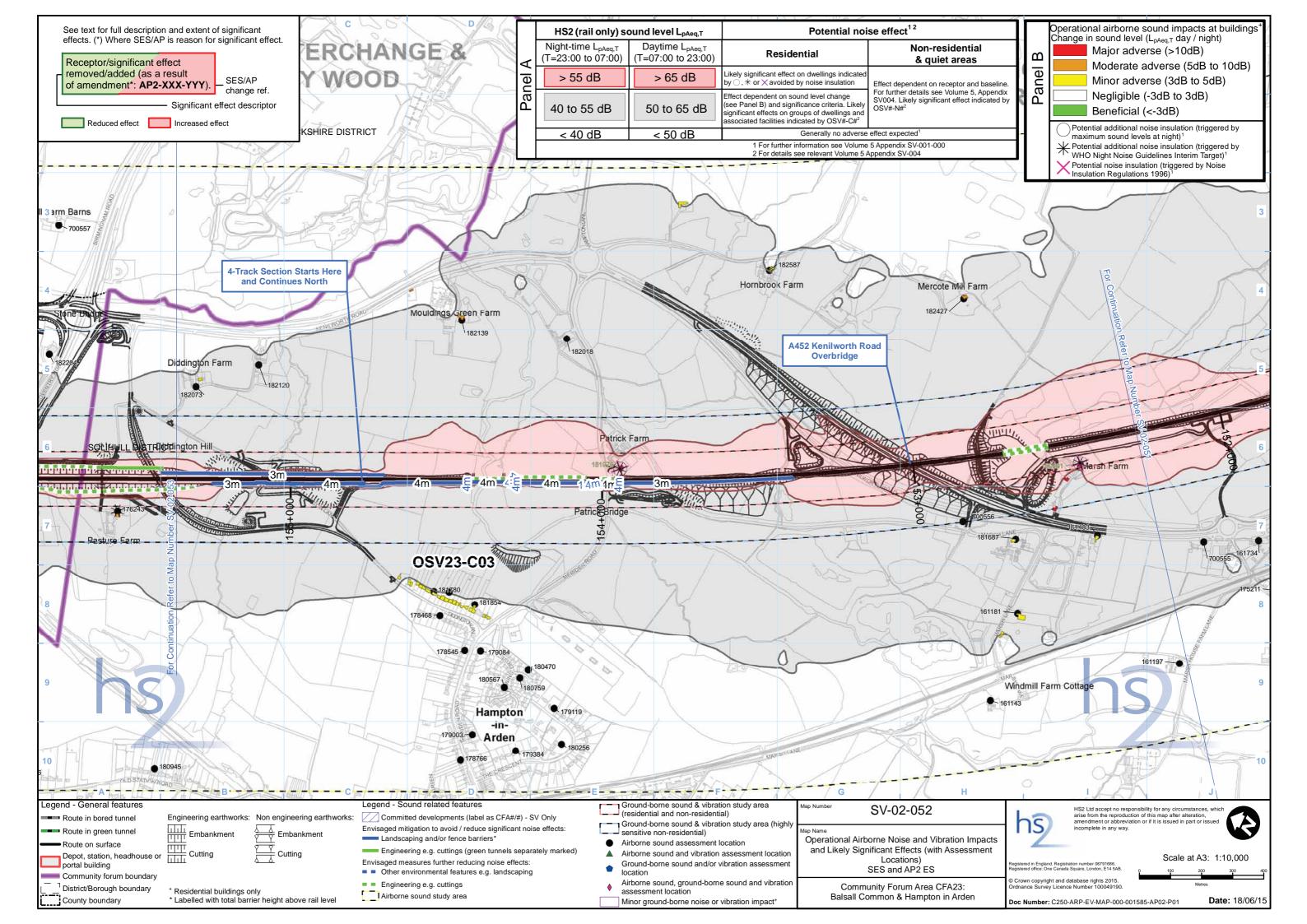
SV-01 – Operational Sound Contour Maps and Likely Significant Effects

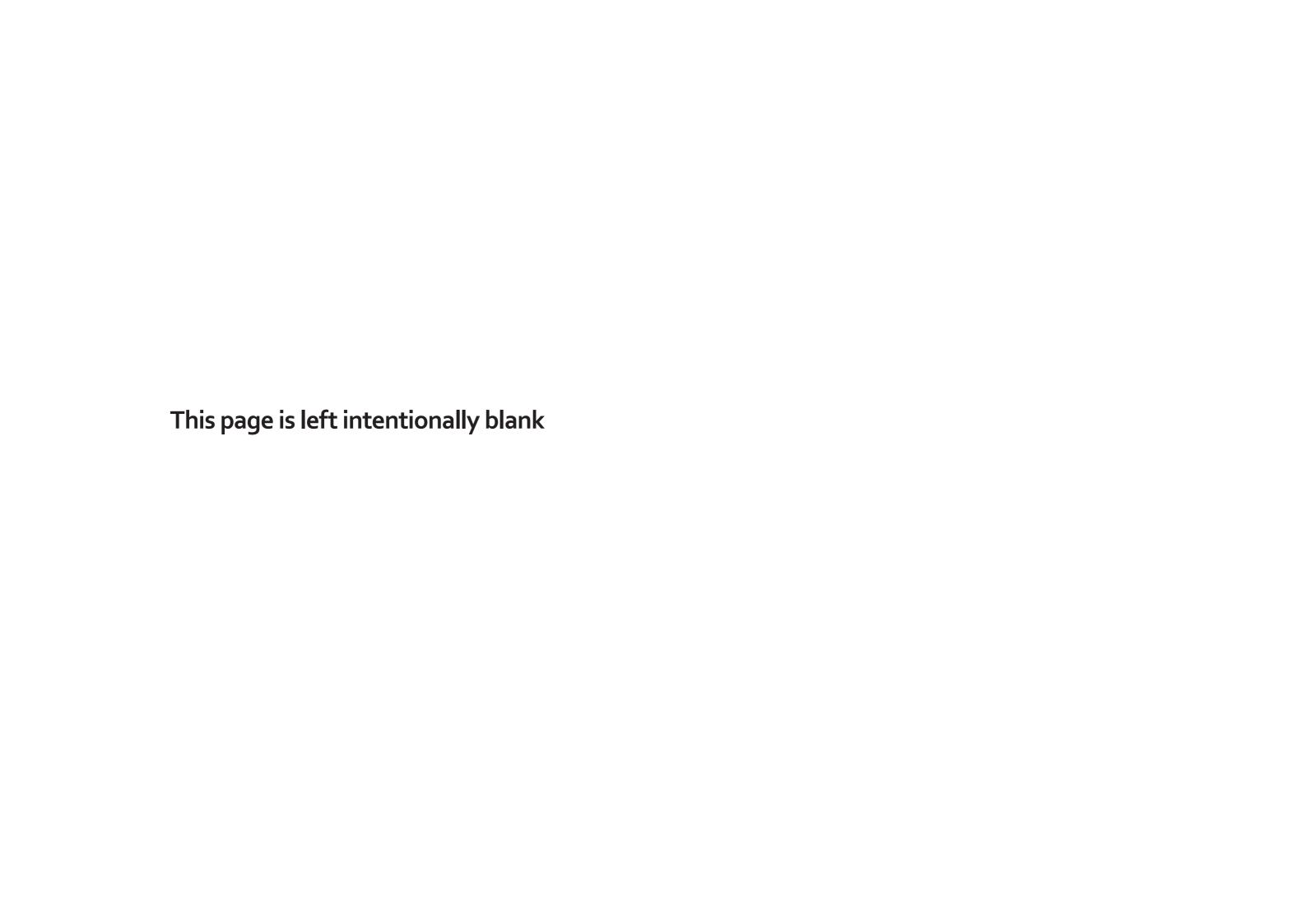
SV-02 – Operational Airborne Noise and Vibration Impacts and Likely Significant Effects (with Assessment Locations)









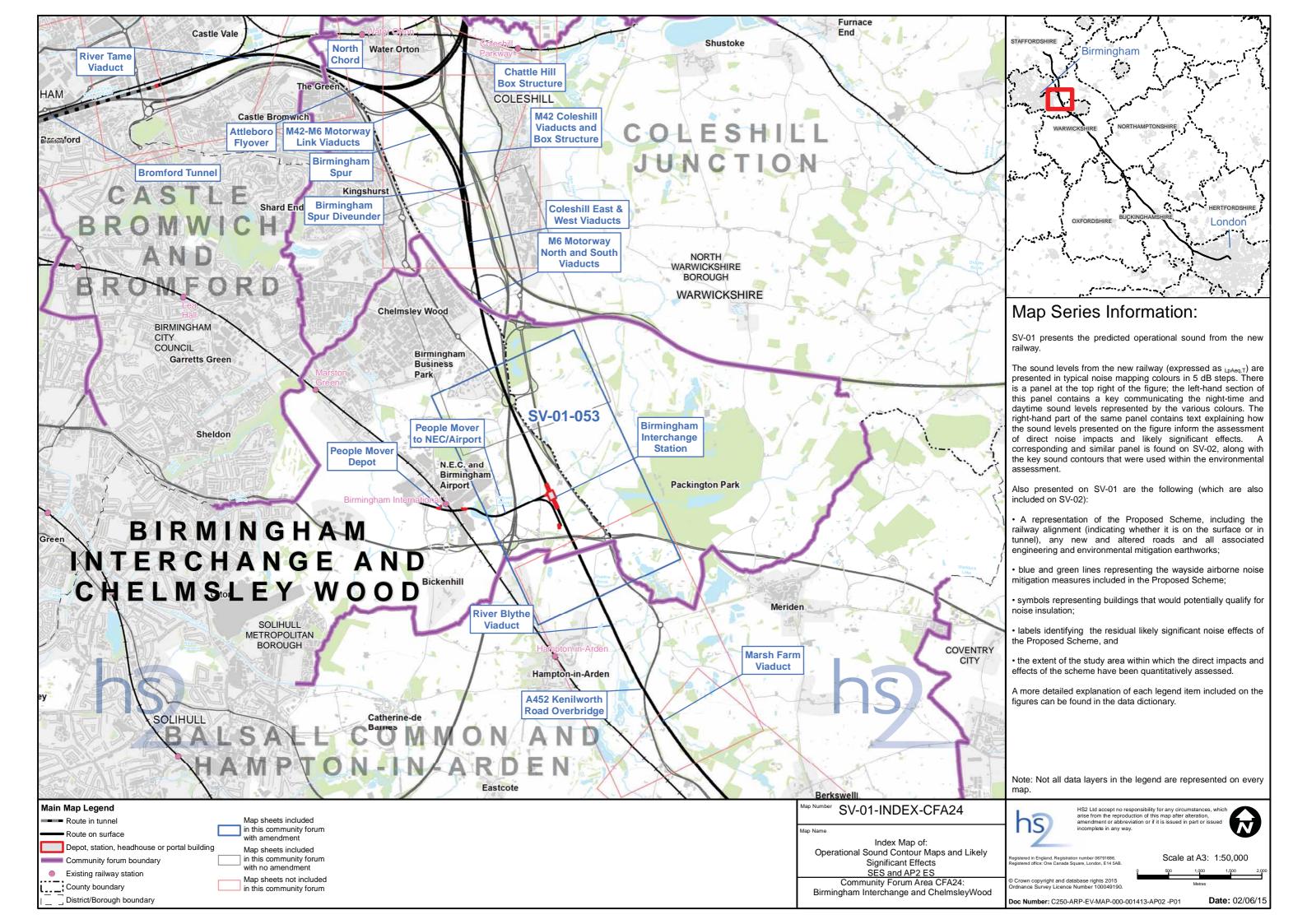


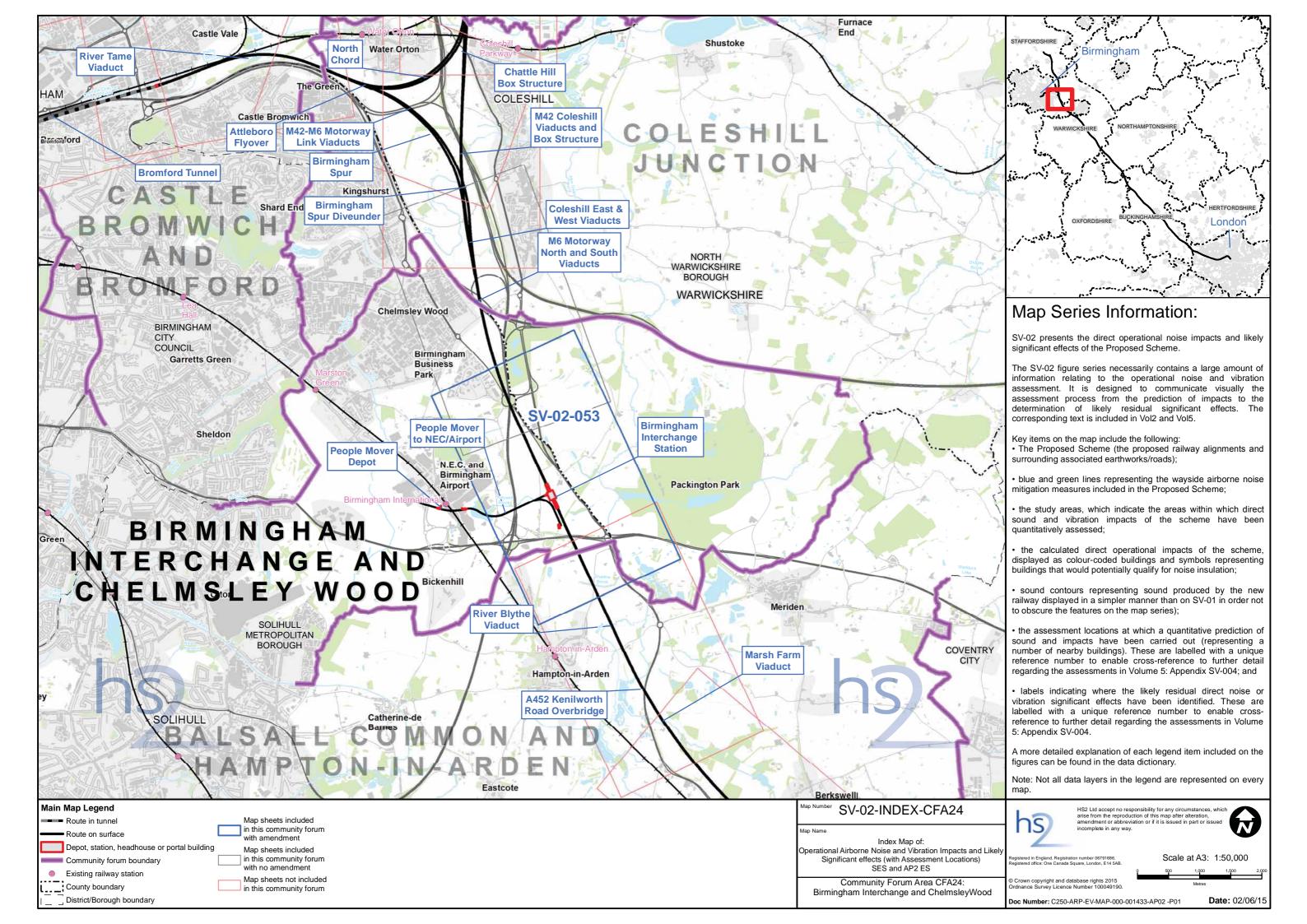
Supplementary Environmental Statement and Additional Provision 2 Environmental Statement

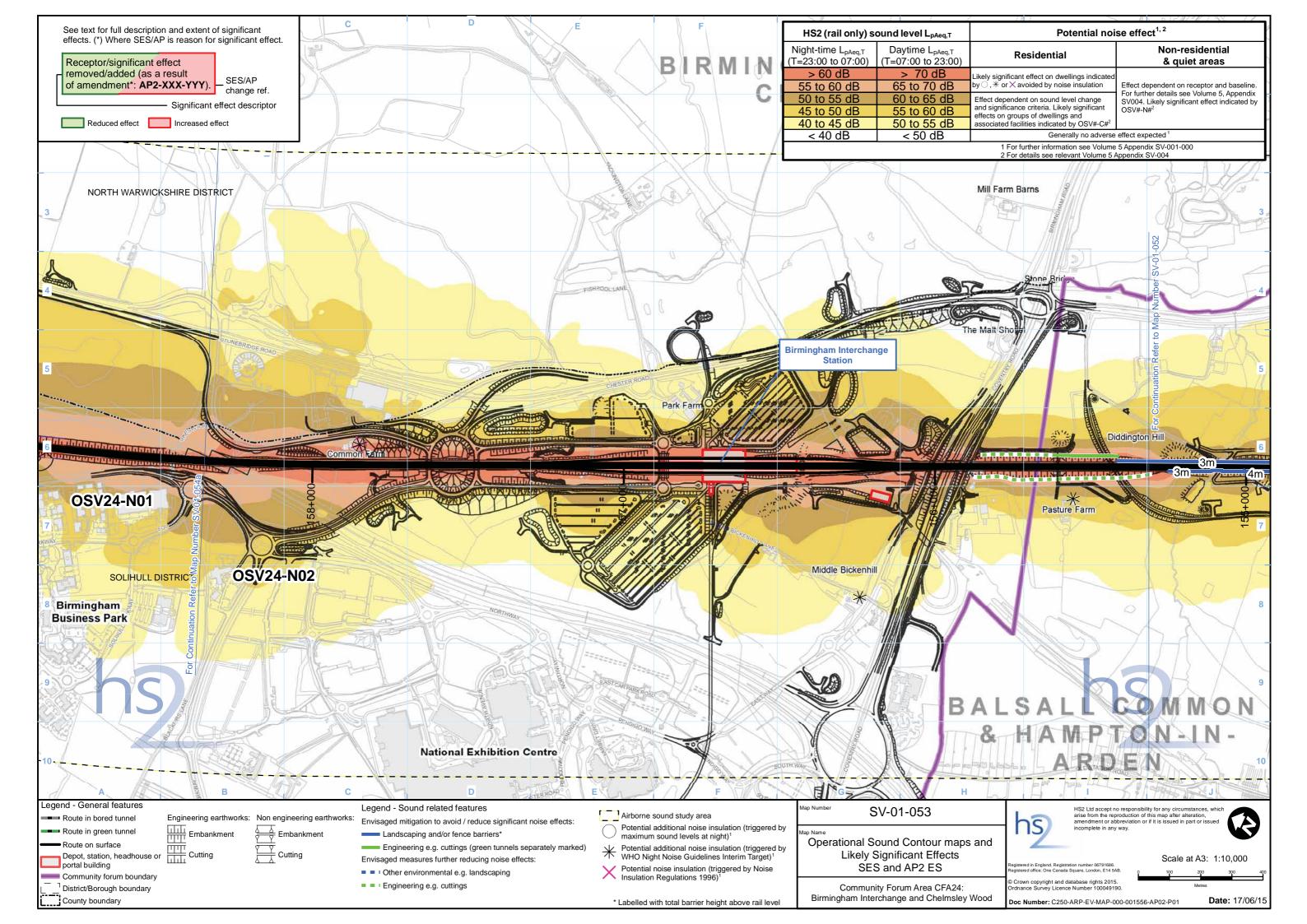
Volume 5 | CFA24 | Birmingham Interchange and Chelmsley Wood

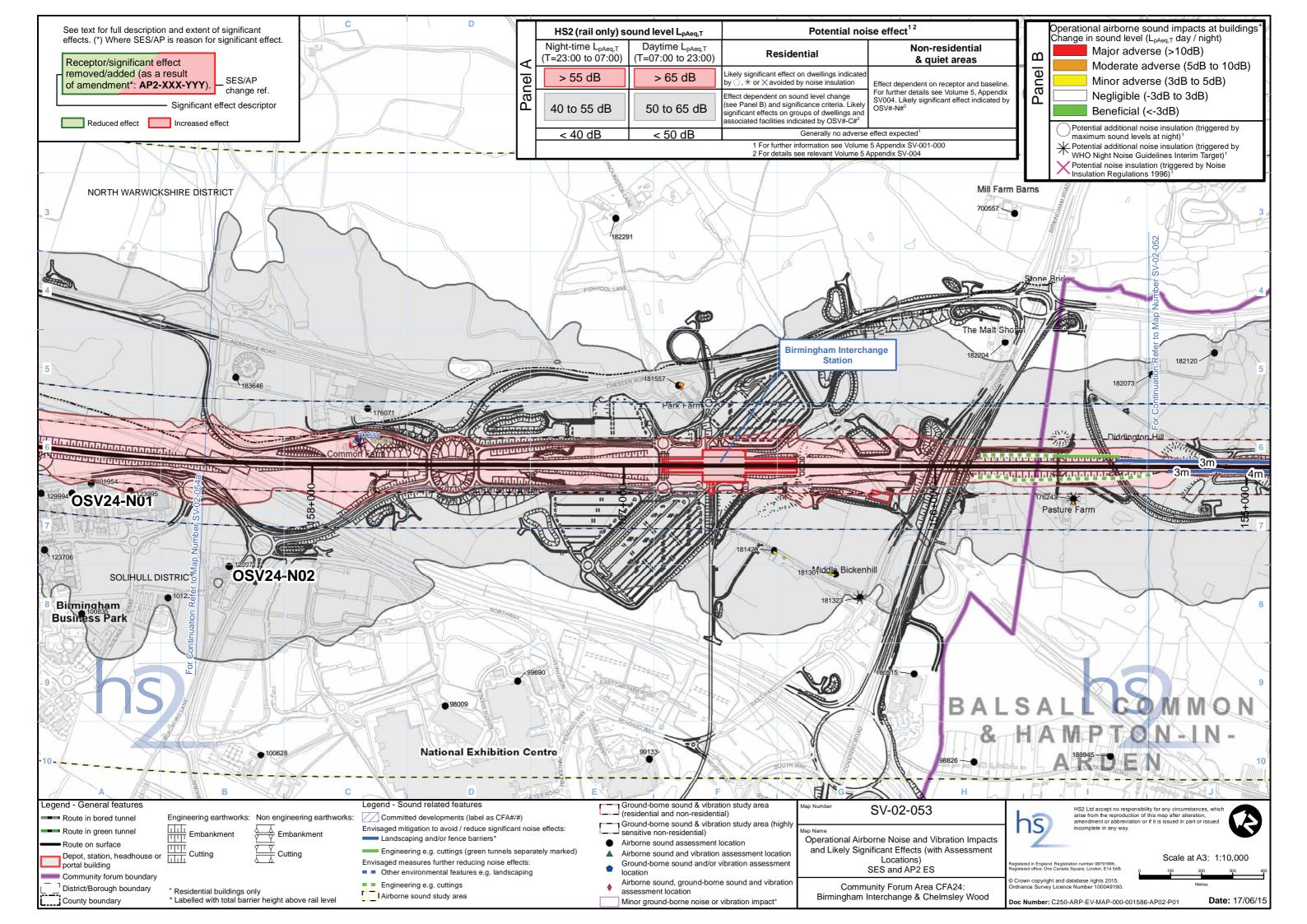
SV-01 – Operational Sound Contour Maps and Likely Significant Effects

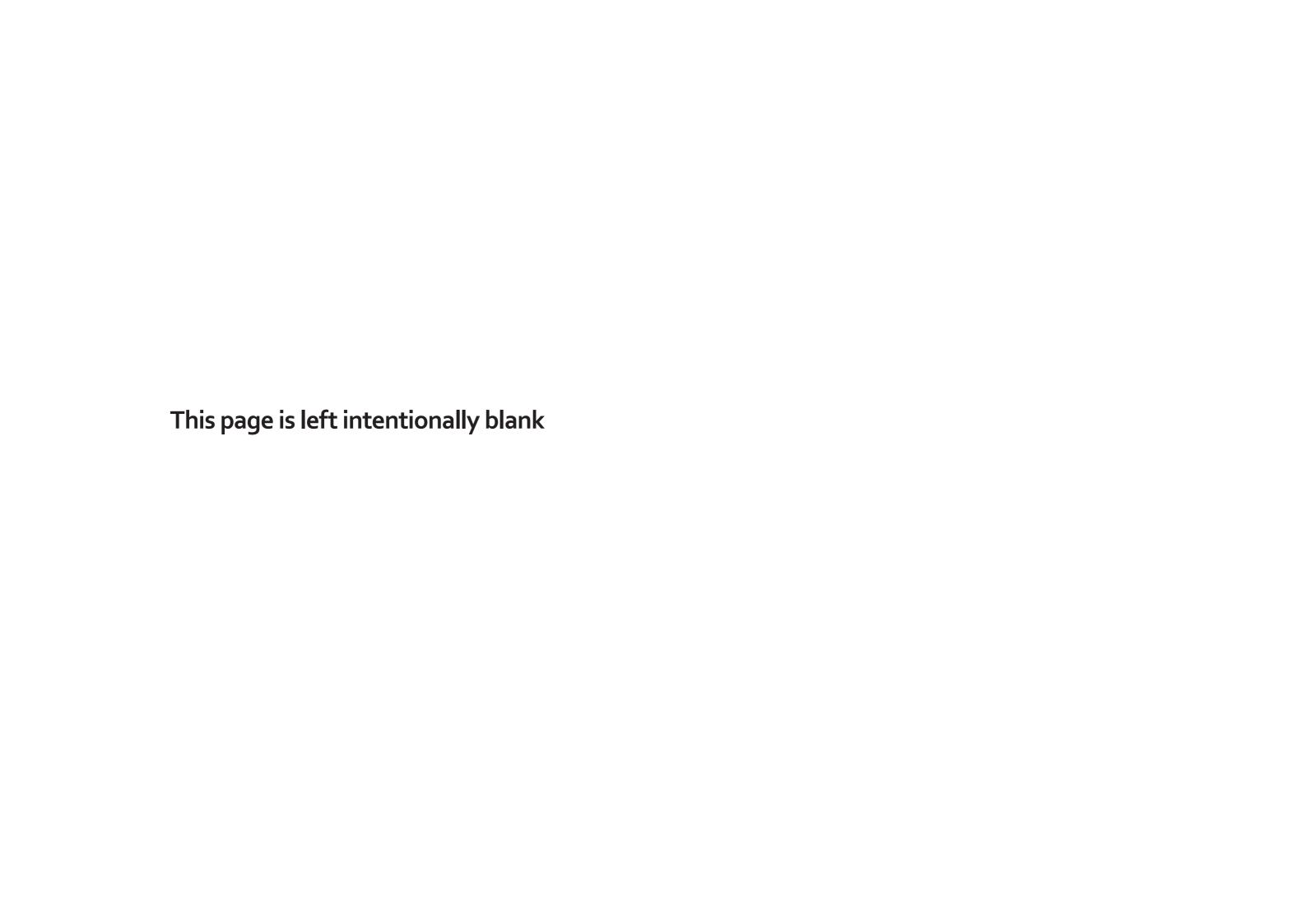
SV-02 – Operational Airborne Noise and Vibration Impacts and Likely Significant Effects (with Assessment Locations)





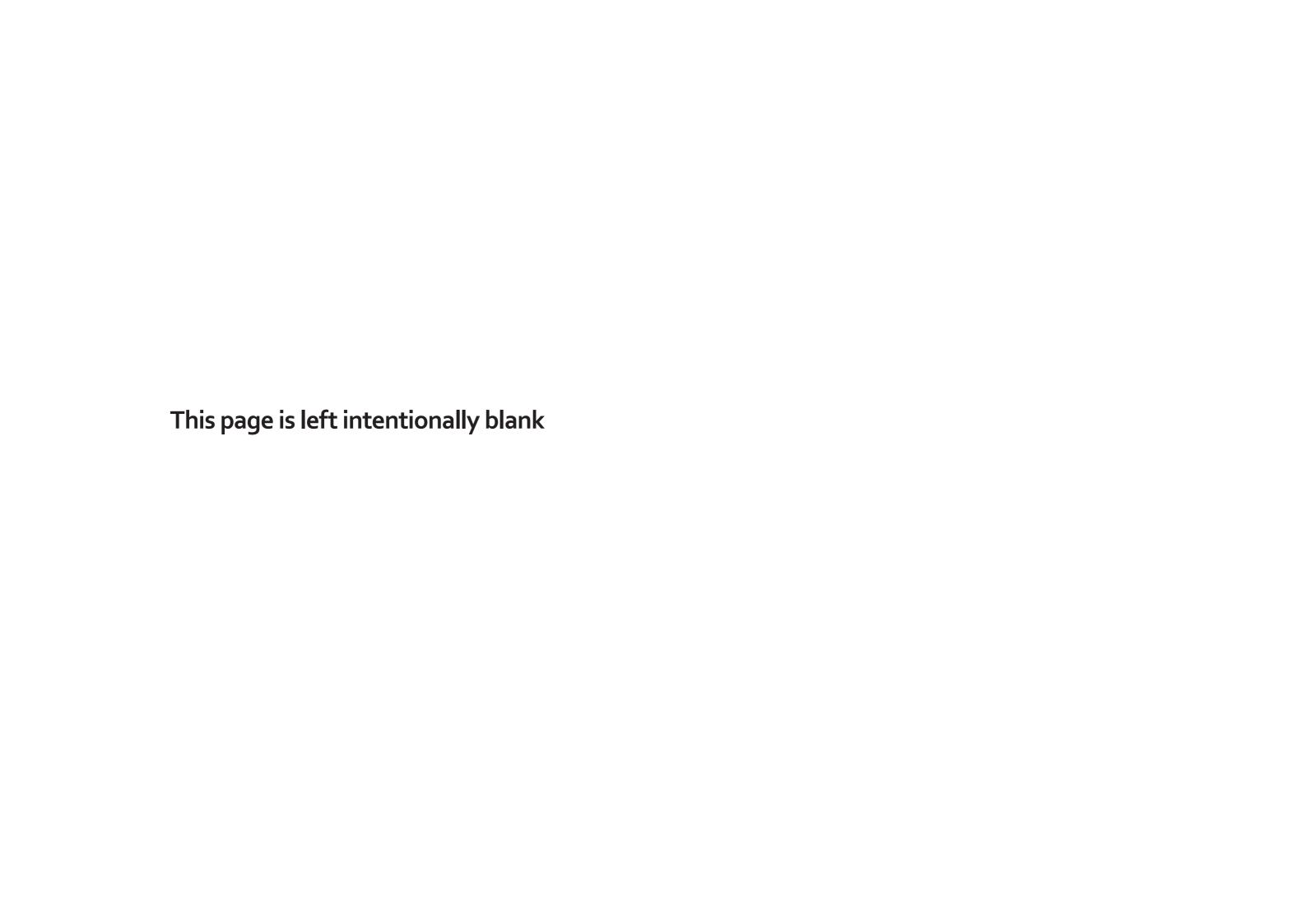


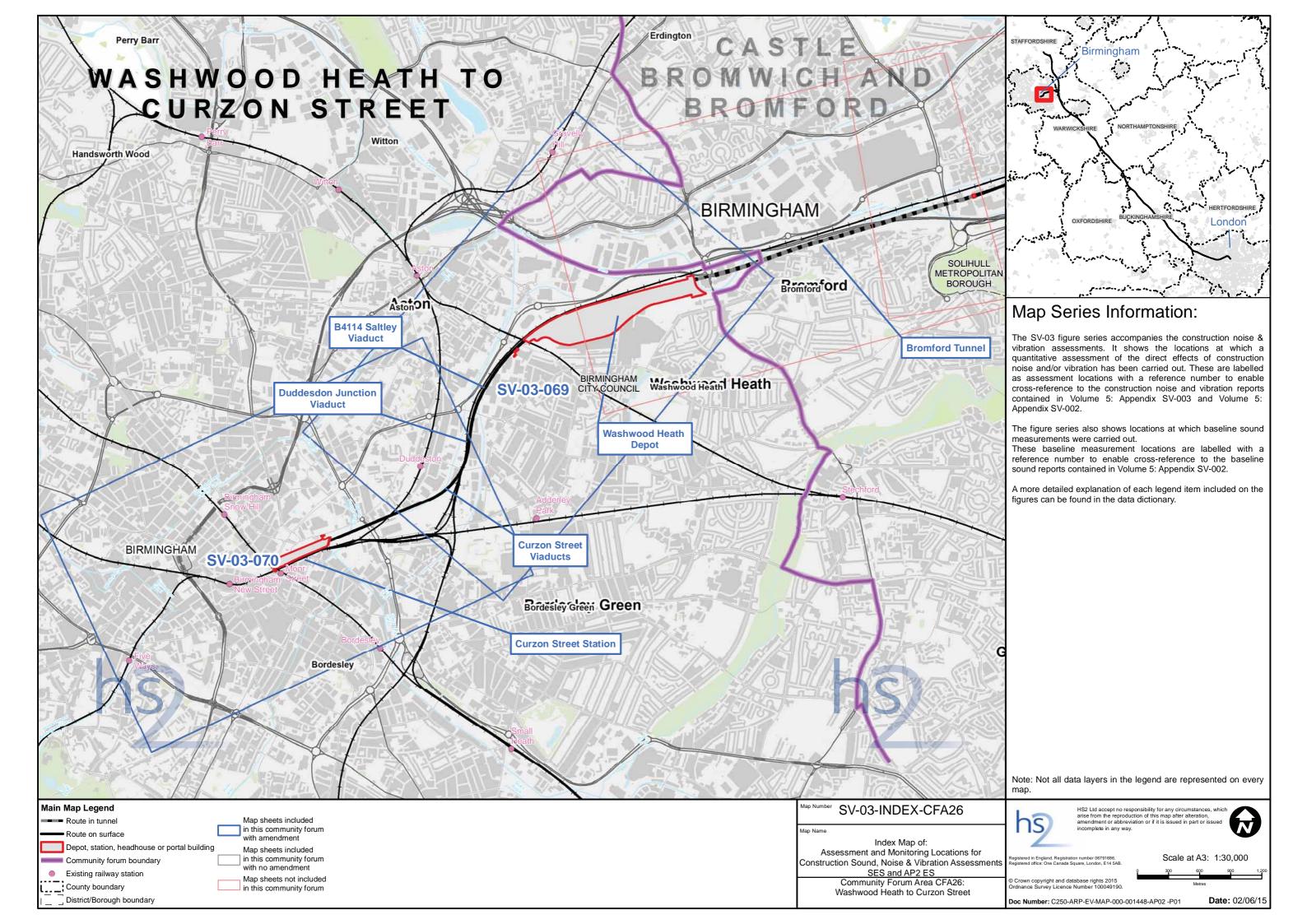


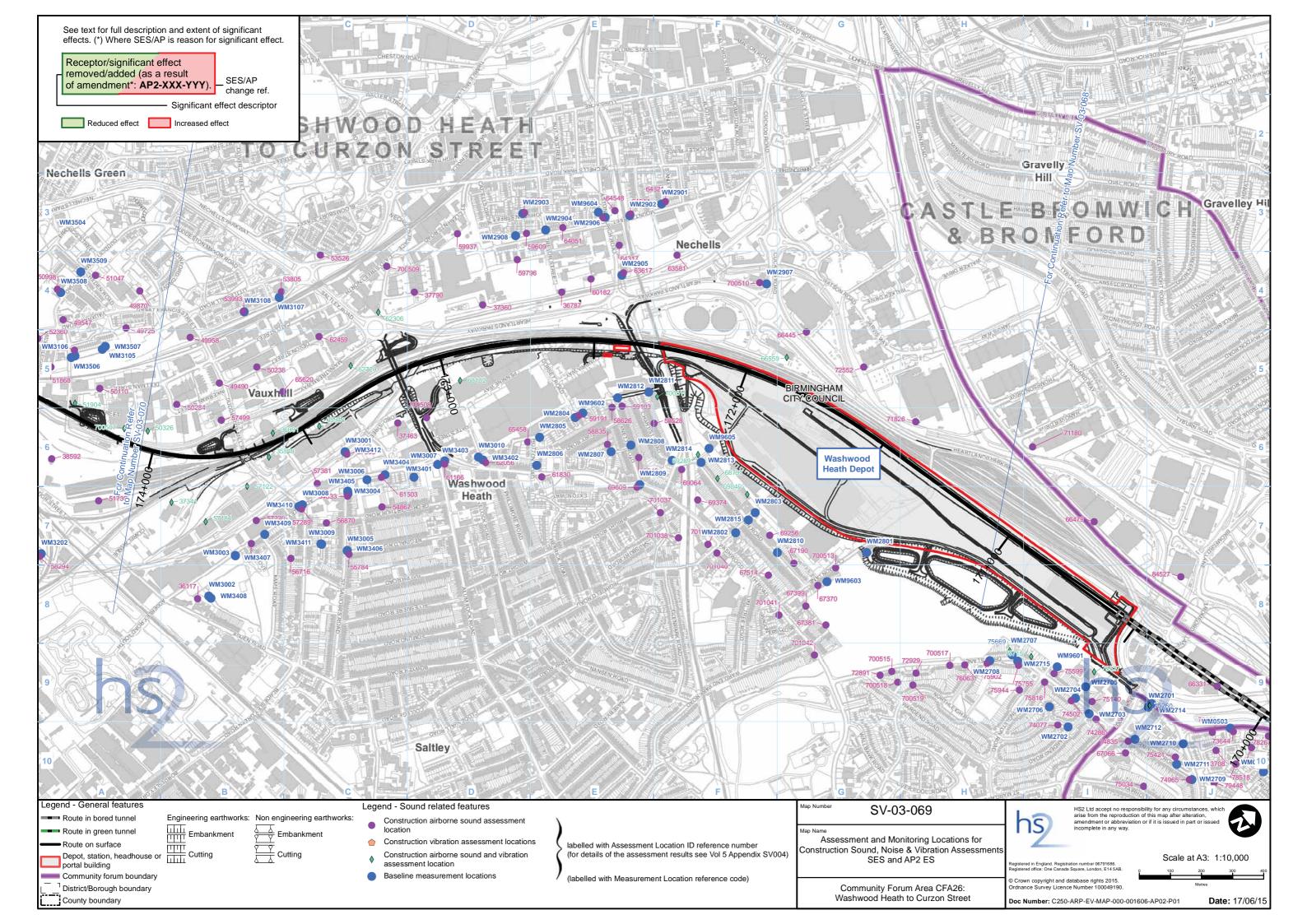


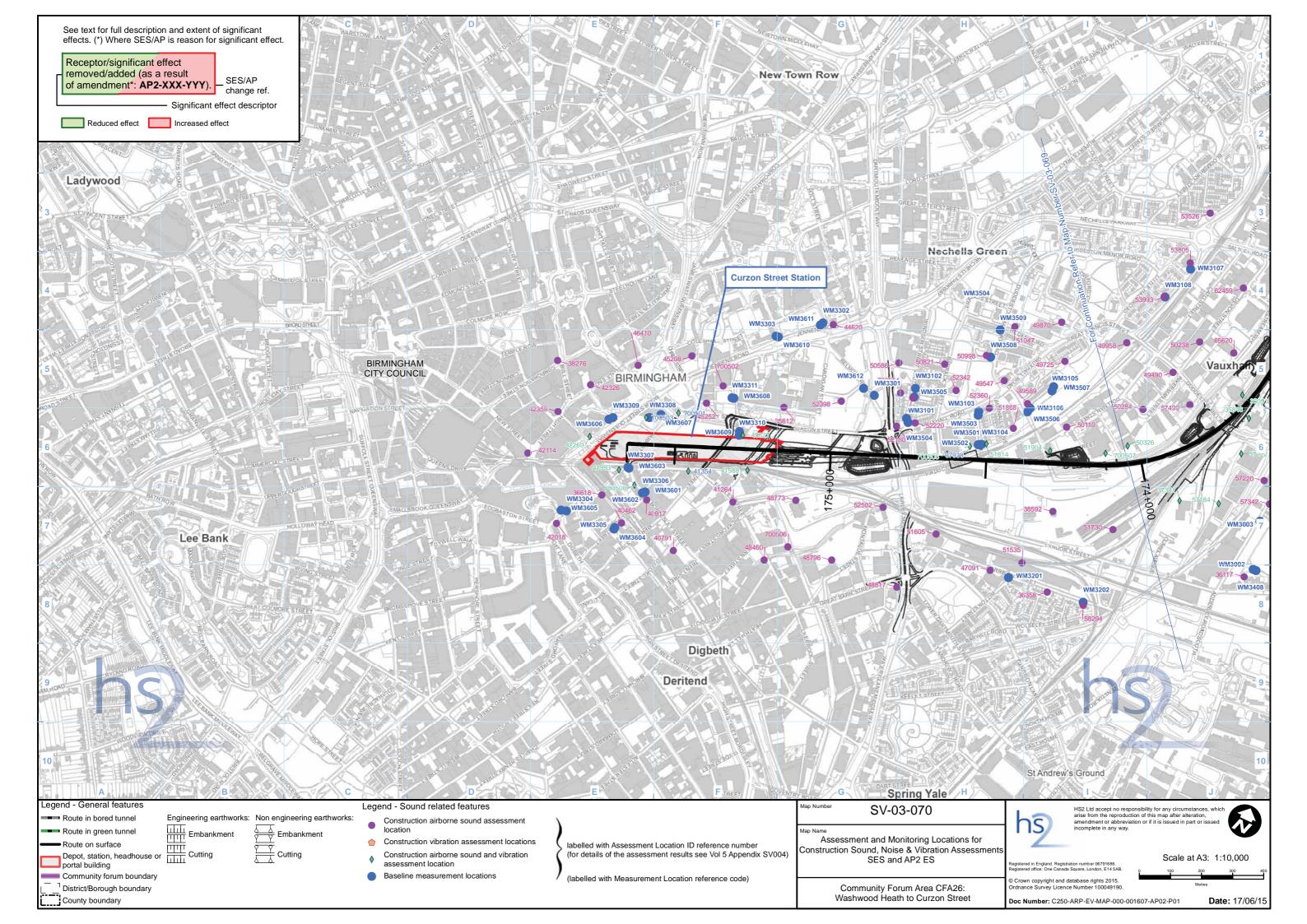
Supplementary Environmental Statement and Additional Provision 2 Environmental Statement

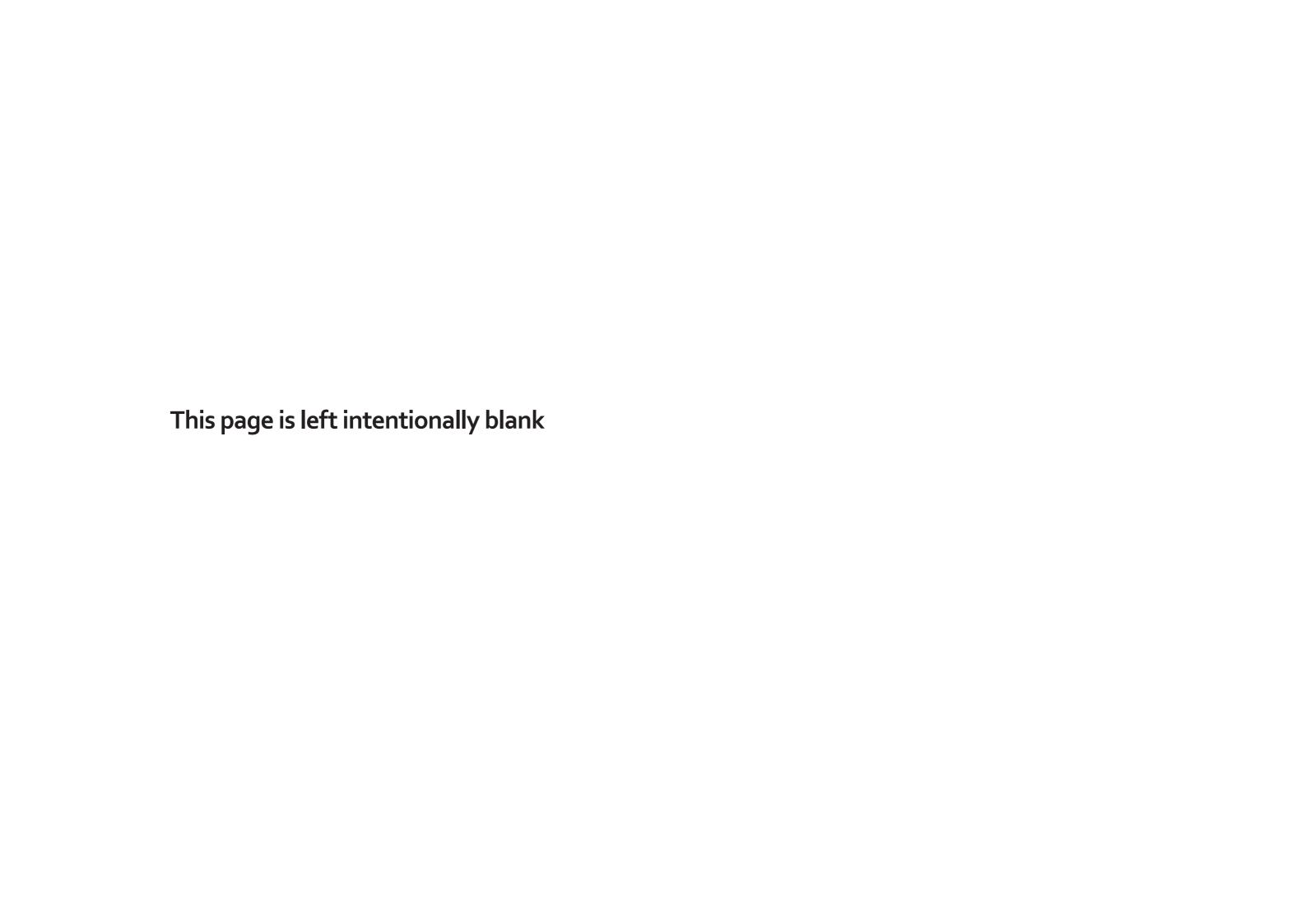
Volume 5 | CFA26 | Washwood Heath to Curzon Street SV-03 – Assessment and Monitoring Locations for Construction Sound, Noise & Vibration Assessments











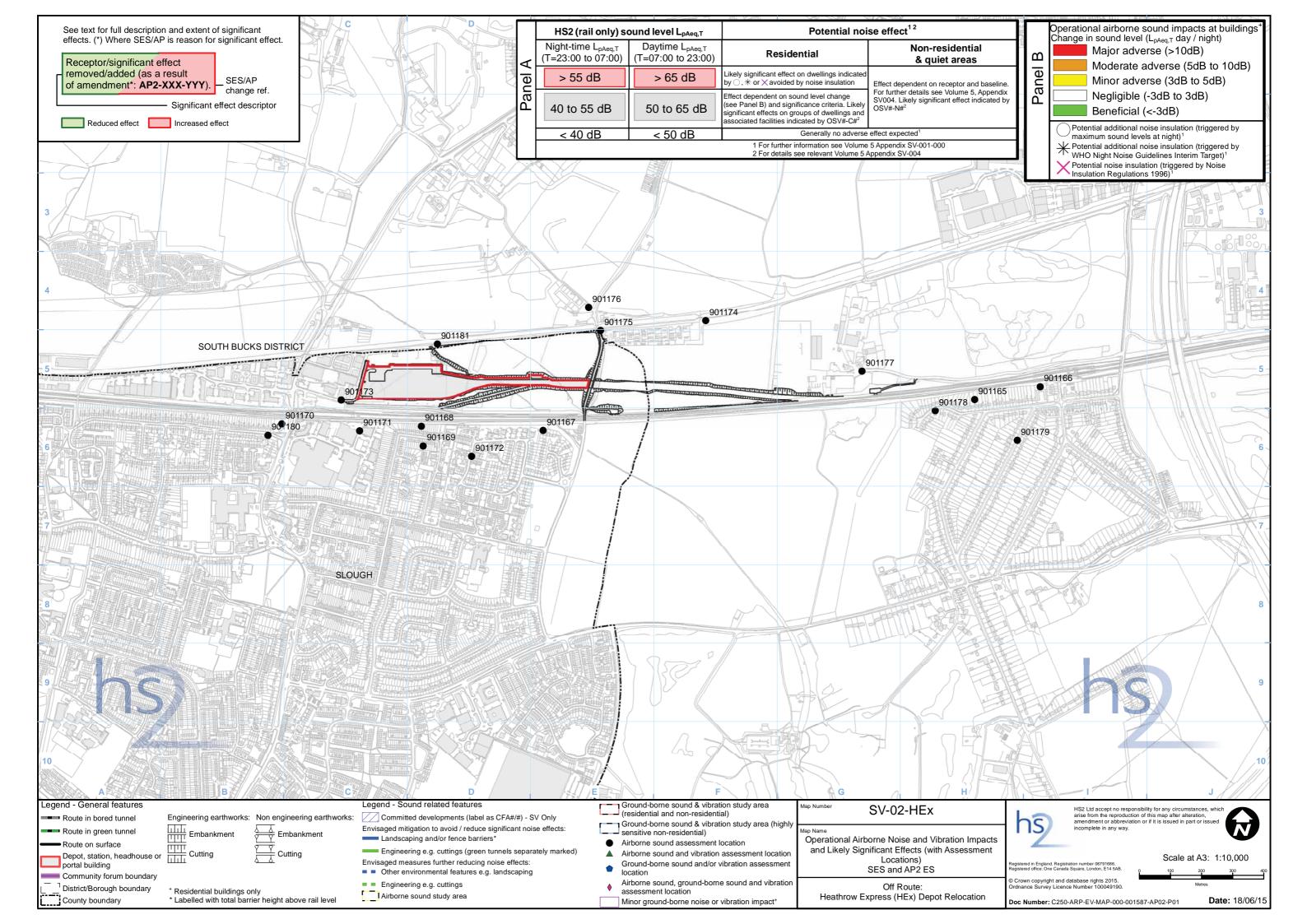
Supplementary Environmental Statement and Additional Provision 2 Environmental Statement

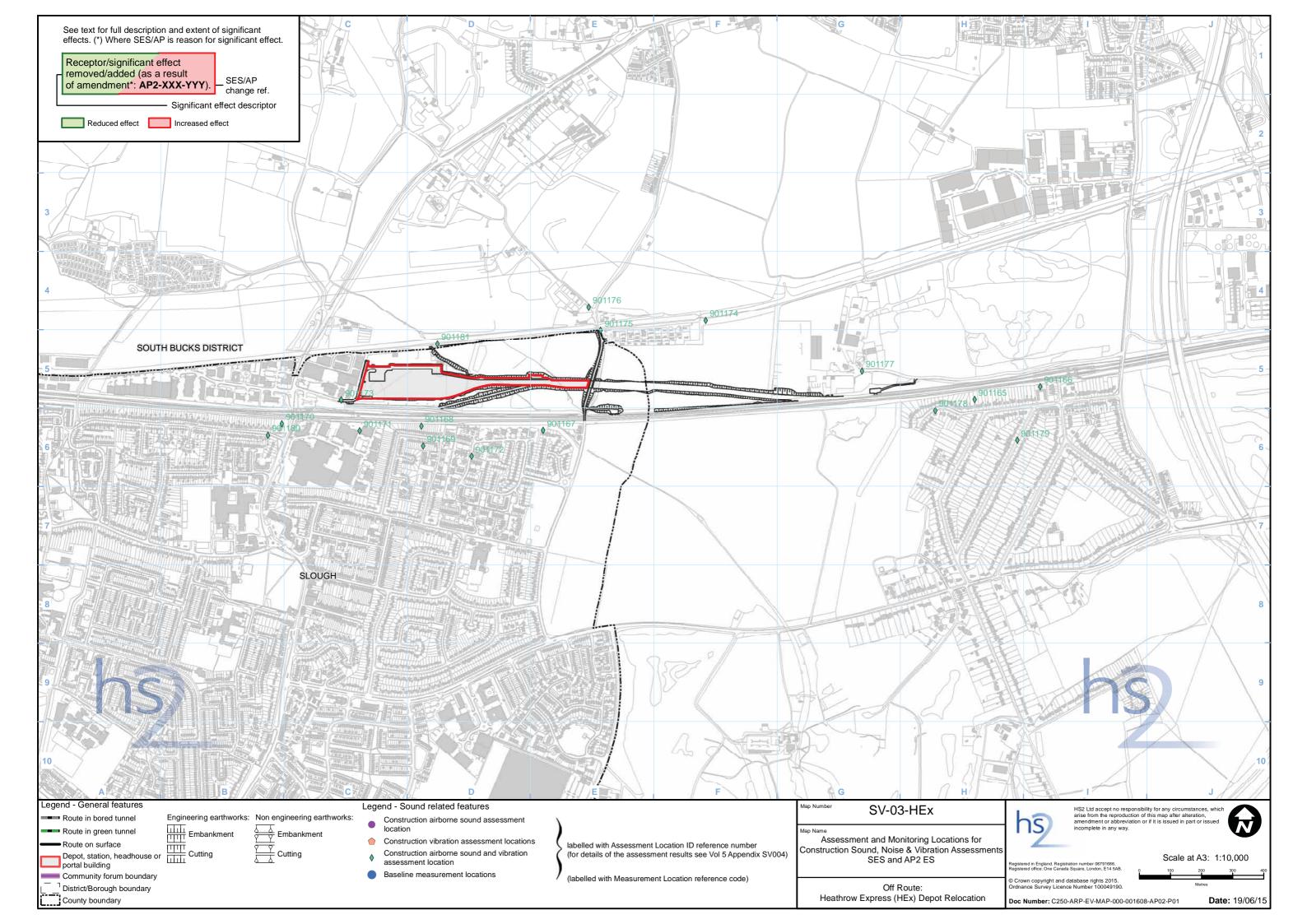
Volume 5 | Off Route | Proposed Site for Relocation of Heathrow Express (HEx) Depot

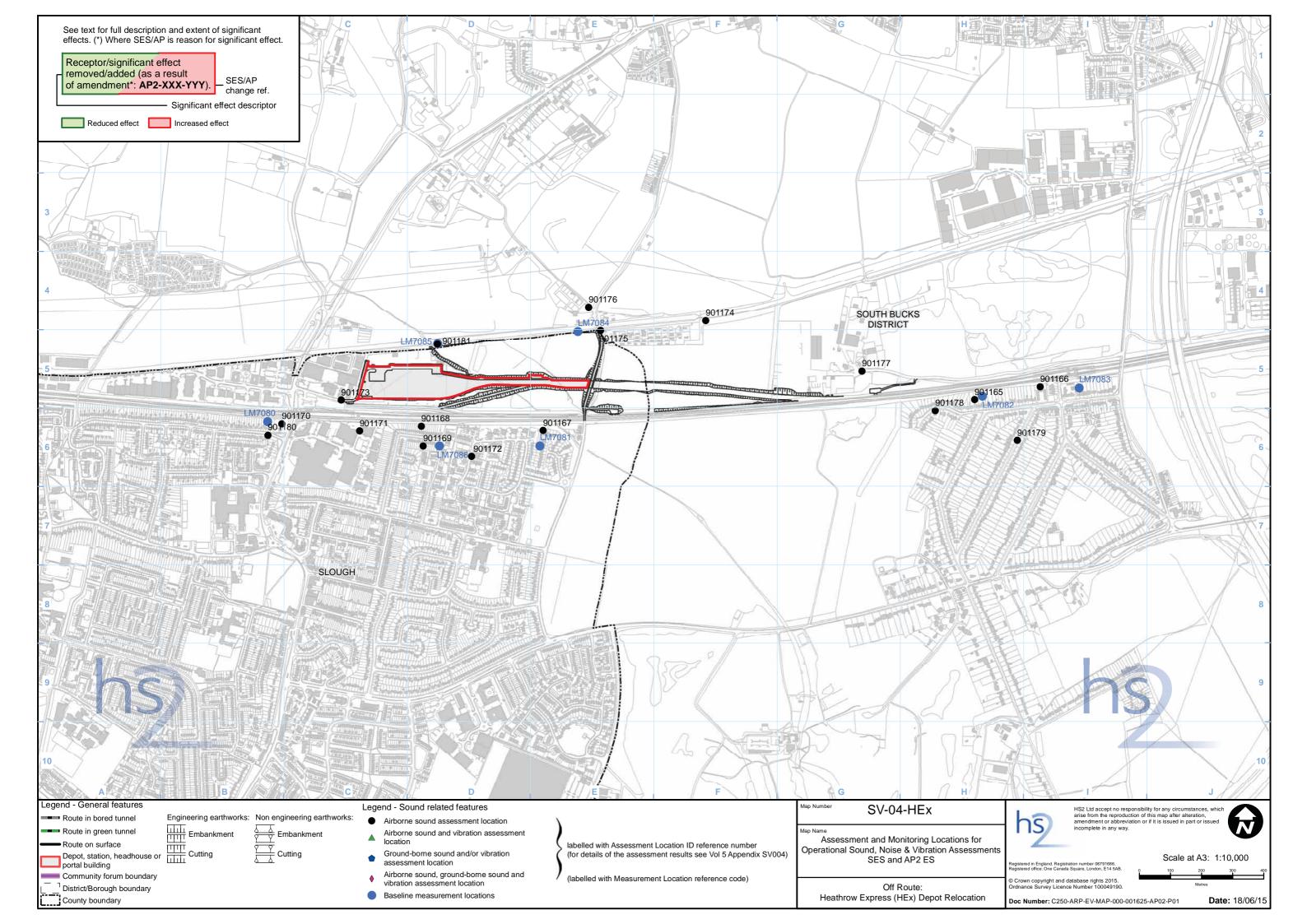
SV-02 – Operational Airborne Noise and Vibration Impacts and Likely Significant Effects (with Assessment Locations)

SV-03 – Assessment and Monitoring Locations for Construction Sound, Noise & Vibration Assessments

SV-04 – Assessment and Monitoring Locations for Operational Sound, Noise & Vibration Assessments









**High Speed Two (HS2) Limited** One Canada Square London E14 5AB

**T** 020 7944 4908

E hs2enquiries@hs2.org.uk

X103